



Milli-Q @ BRDG



Millipore System @FV



Gas Tanks& Supplier



Water Faucets



Gas Supplier, Local



**Mechanical
Air/Vacuum/Gas/Water
Systems @BRDG**

STLCC_CPLS;Morrison 9/11/2015

Lab Systems: Monitoring, Alarms,Water, Gas, Vacuum, Compressed Air, IT, Chairs, Carts, Casework

(Detect Instrument Picture to Jump to that section of SOP)

(On Instrument pages, detect text box to jump to installation details)



Door Locks



Dehumidifier



Clamp Light



Gas Monitors



**Freezer Alarm
Sensor/Dialer**



Lab Stool



Lab Cart

**I.T. Network
BP Port #
Network
Map**

Prepared by: Bob Morrison

STLCC, Instrumentation Specialist

Oct 2008, Last revision July 2015 (dehumidifiers)

Lab Systems: BRDG, Monitoring and Maintenance Schedule

- **Daily Check**

- **Freezer Alarm Status** (-80, -20, Cold Room, -20CRO, -132 Cryostorage) check to ensure panel is on/operating.
- **Ice Bin**; inspect for quantity/quality and alarm status
- **Millipore**; check control panel for “Ready” state , Reservoir level %, and any alarm messaging
- **Air, Vacuum, Gas ports**; check pressures for > 20 seconds in one room
- **Percival and CO2 incubators**; check temp, CO2, and pressure of supply tanks if active in lab sessions
- **Shaking Incubator and Refrigerated Centrifuges**: check PV vs. ambient vs. set value if running
- **Quant, BioPlex, ABI, Imager, Bio-Mek, Centrifuges** : Turn off instrumentation if not being used

- **Monthly**

- **Emergency Eye Wash and Shower Systems** ; perform test and sign sheet Cold Room and R119
- **MACSQUANT**; Run Clean and Flush protocol
- **Bio-Plex Array Reader**; Run Validation protocol if the device has been used in this interval
- **Autoclave**; perform “Blow Down” protocol
- **Nanodrops**; perform reconditioning protocol, run calibration test and calibration procedure every 6 months
- **Ice Machine**; clean air filter intake on front upper panel
- **Mechanical R111**; Check logs on compressors and other devices
- **Cold Room**; replace paper monitor wheel every 6 months on control panel
- **Small freezers** in each lab room; check temp and frost conditions
- **Fire Extinguishers**: Check for green safe condition those in classrooms and main corridors

- **Scheduled, Device Dependent, or Seasonal**

- **Cold Room compressor**; (Spring-Fall Monthly, bi-weekly May/June) Clean air filter intake vents (N dock area)
- **Water Supply to Air Compressor**; May and Nov, switch Supply source per this protocol.
- **Biological Safety Cabinets ,Glasswasher**: Cabinets in July, George 314-974-6616 from ACE Lab Systems
- **Ice Bin**; Between Semesters, Sanitize using mild bleach per protocol
- **Millipore**: Follow alarm messages: Major annual PM mid-Sept (UV lampsx4, Quantum, Progard, Vent) , Prepak 90days

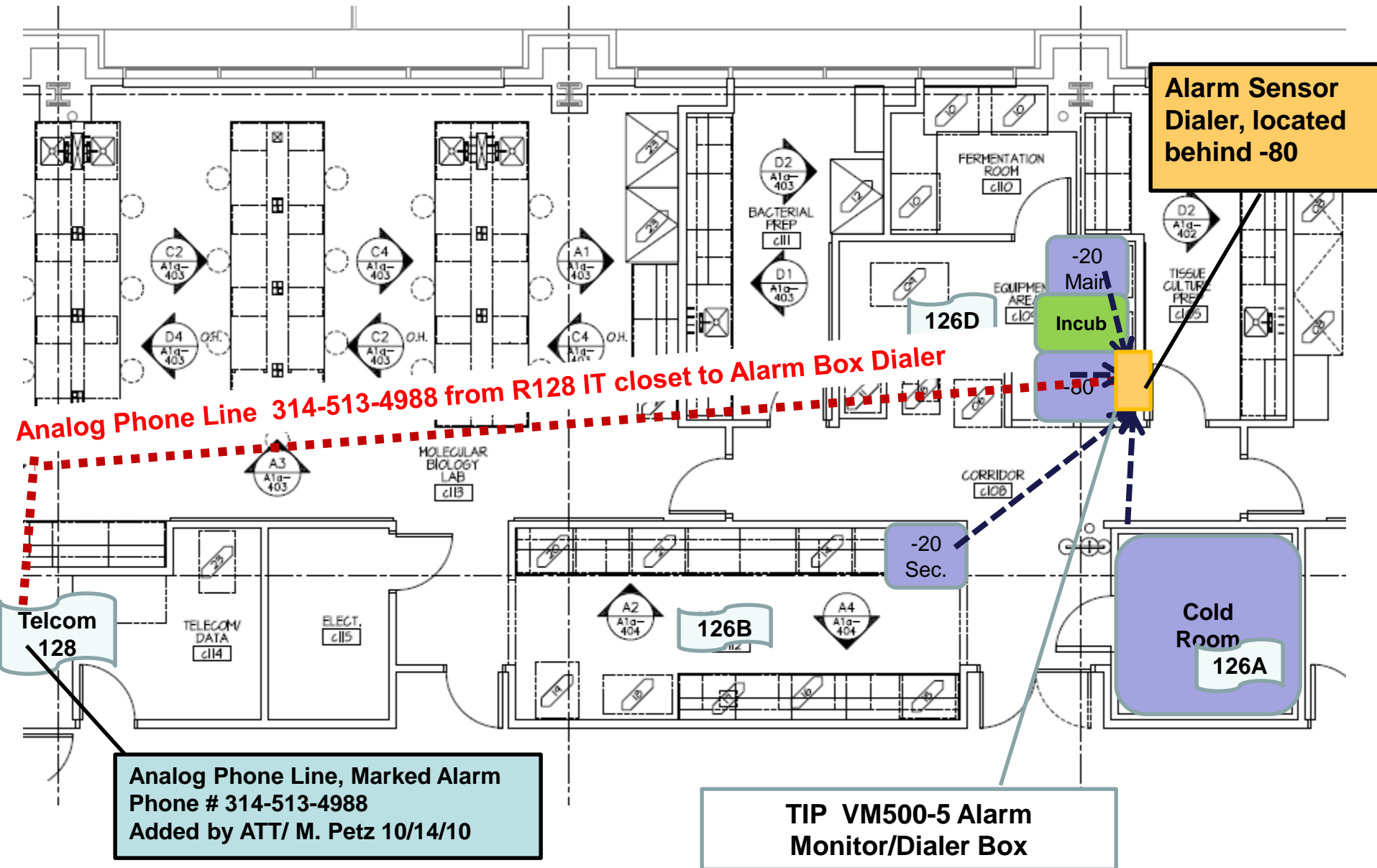
- **Power Outage Considerations**

- **Air and Vacuum Compressors R111**: May not restart after extended outage, must be powered on again
- **Ice Maker**: Does not restart ice making, must push “ice” button to resume production

STLCC_CPLD Network and Phone systems: Check P: drive , Webserver, Shared server, and phones (dial in/out/receive)

Lab Systems: BRDG;Freezer Alarm System Planning Layout

2 line, 22 gage stranded wire from Device Sensors to Alarm Box



Lab Systems: Freezer Alarm Control Panel Wall Layout

Twisted pair Sensor Lines to:

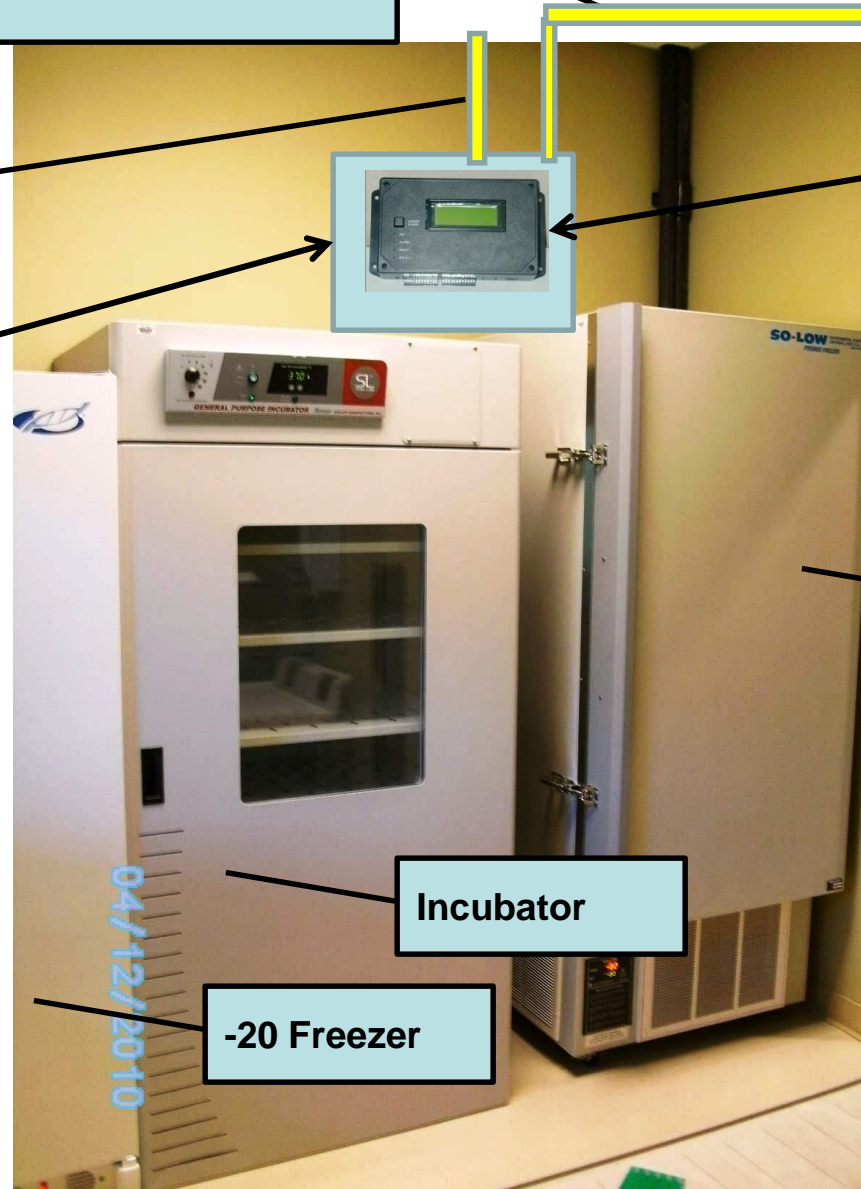
- Cold Room sensor across hallway
- Minus 20 freezer in Instrumentation rm

New: Analog Phone Line
Ceiling drop connected to
IT/Phone closet

TIP #MITREC004
VM500-5 Alarm Dialer
Made by Omegaphone
Omega.com
Model: OMA-VM505



12" x 12" Alarm Control
Box mounted behind -80

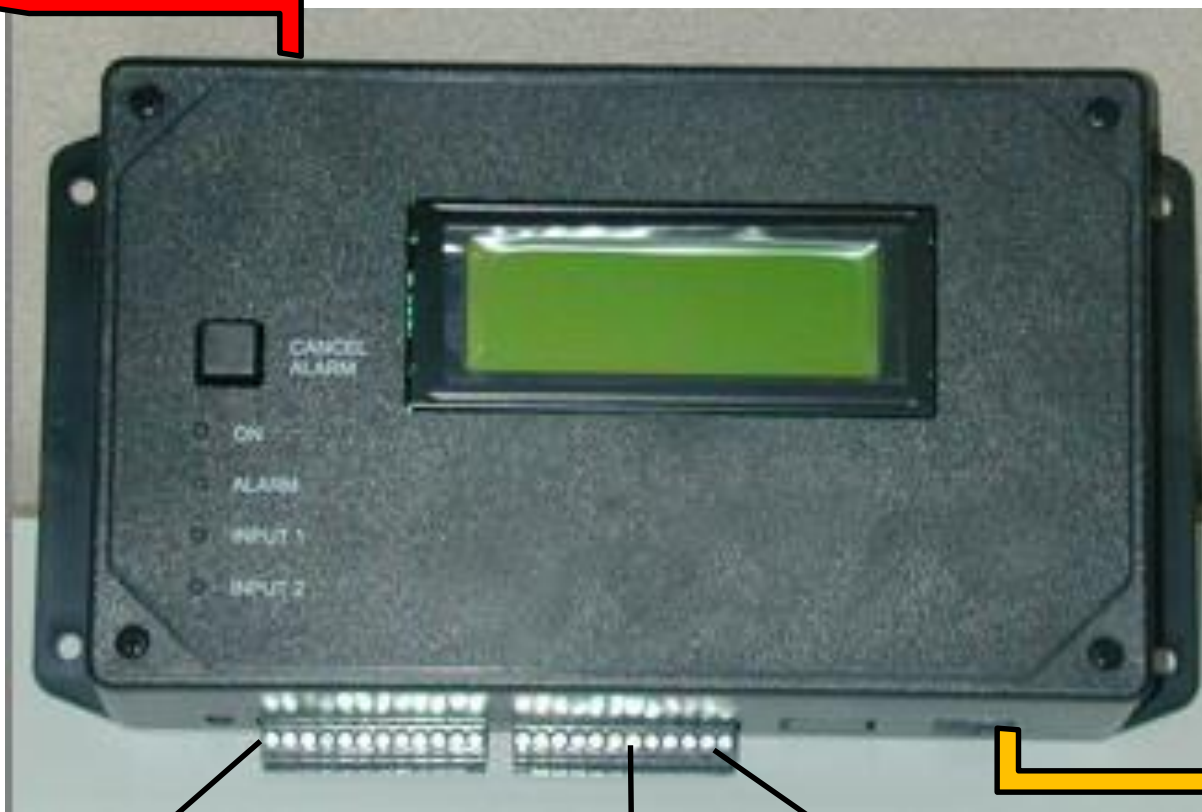


Incubator

-20 Freezer

-80 Freezer

Lab Systems: Freezer Alarm; Control Panel



TIP Temp Pro d: #MITREC004
VM500-5 Alarm Dialer
Made by Omegaphone
Omega.com
Model: OMA-VM505

Notes:

- 1) Requires ANALOG phone line, not digital.
- 2) Programmable by voice message text prompts after dialing into the control panel (see user manual).
- 3) To access dial 314-513-4988, enter PIN 0000.

Connections for
1-8 RTD sensors
2 per

Connections for
1-2 Door open
sensors

Ext alarm relay

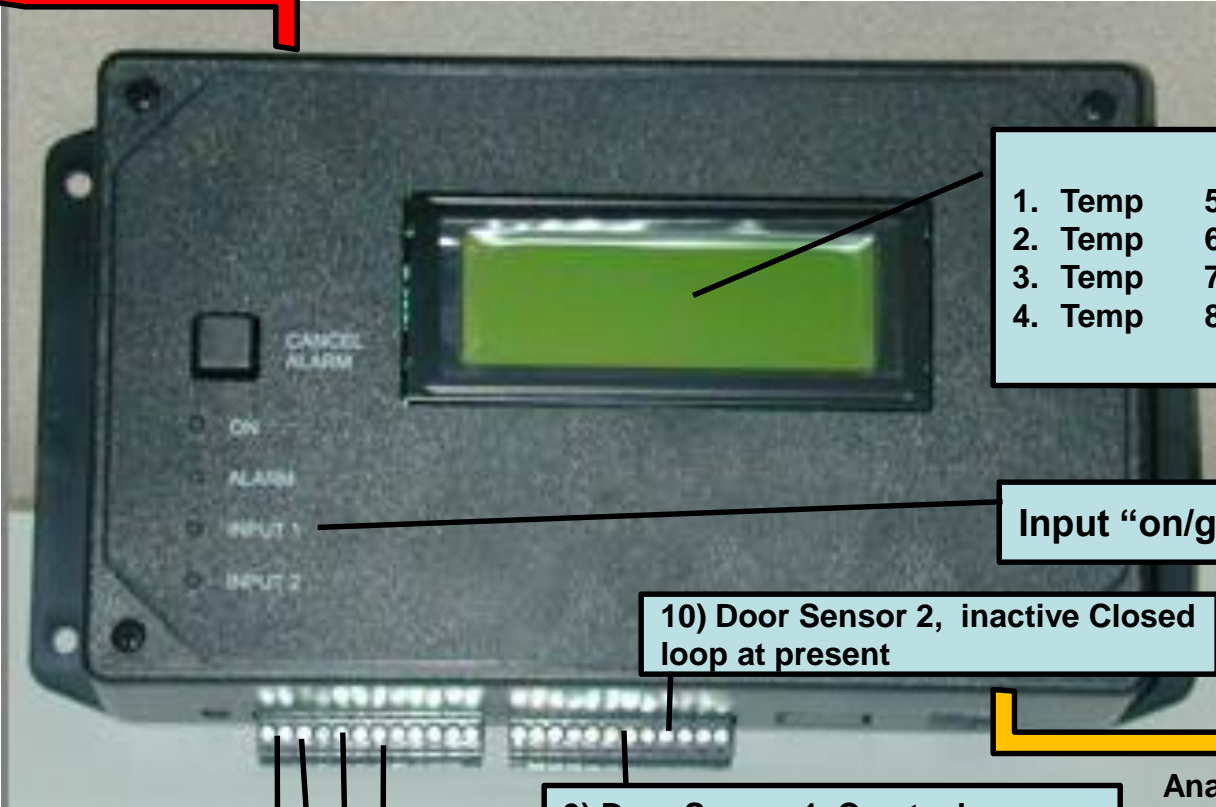
Analog Phone Line
Phone # 314-513-4988
Outside line: dial 8-then #
Added by ATT/ M. Petz 10/14/10
Analog line By Guarantee Elec 11/4/10
Moved to Shoretel: 3/31/11 by ATT (Ed)

Hotlink to Omega VM505-Alarm Dialer User Manual... pdf 25 pgs

Power Adapter line to 110V

Lab Systems: Freezer Alarm; Control Panel

Sensor Connections and Settings



- | | | |
|---------|---------|----------------------|
| 1. Temp | 5. Temp | SNR # displayed |
| 2. Temp | 6. Temp | High on Sensor # |
| 3. Temp | 7. Temp | Low on Sensor # |
| 4. Temp | 8. Temp | Time Sensor on Alarm |

Input "on/green", Door Sensor enabled

10) Door Sensor 2, inactive Closed loop at present

9) Door Sensor 1, Cryotank; R126C, Remote alarm triggered

4) -20 CRO; R126B, L=-30C, H=-10C

3) Coldroom; R126A, L=-2C, H=10

2) -20; R126D, L=-30C, H=-5C

1) -80; R126D, L=-90C, H=-55C

Analog Phone Line
Phone number: 314-513-4988
Added by ATT/ M. Petz 10/14/10
Analog line By Guarantee Elec 11/4/10
Fix Dialtones: ATT 11/9/10
Implemented: 11/10/10 RGM.
Moved to ShoreTel and tested 3/31/11 RGM

Set to -5C to avoid calls when door is left open too long for lab use

Corrected sensor from -67 (output) to -77 (actual) on 6/7/11 RGM

Lab Systems: Freezer Alarm; Monitor/Set , Access from Any Phone



CHECK STATUS:

- 1) Dial 314-513-4988, wait for 4-5 rings for Monitor to Answer
- 2) Enter PIN "0000", note from digital phones at STLCC enter each digit slowly, you may even have to enter five zeros vs. four.
- 3) Listen to options for Status or setting limits
- 4) Press "1" for Status, wait for message to Enter Sensor Number
- 5) Enter the number before the parenthesis below to access the sensors. For instance, enter "3" on your phone to get a status report of the Cold Room.
- 6) Enter "0" to exit and end the phone call.

SET LIMITS:

- 1) Dial as above, enter PIN, listen for prompts
- 2) Enter "2" to set Limits, system will respond with "Enter Sensor "
- 3) Enter 1,2,3,4 for appropriate sensor as shown in boxes below
- 4) System will respond with "Current message is....."
- 5) Enter "1" to change, wait for tone, record short message, wait for system
- 6) System will continue thru all options, Enter 1 to change, Enter 2 to skip without changes, Enter 0 to stop setting for this sensor
- 7) Note: Due to digital/analog issues, you may have to enter extra digits or enter some values twice including PIN as 00000 vs. 0000.
- 8) Note on Negative Values: Enter asterisk "*" before number for negative values

TURN OFF CRYO or Door Open Circuits

- 1) Dial as above, enter PIN, listen for prompts
- 2) Press "2" to set Limits, system will respond "Enter Sensor "
- 3) Press "9" for Cryo sensor (door 1)
- 4) System will respond "Door 1 time delay is xx minutes"
- 5) Press "1" to change limits or any other key to exit
- 6) System will respond " Enter number (delay minutes) then press #
- 7) Enter any value (0 to 999). Note an entry of "0" will disable this door sensor
- 8) System will respond with entered value and return to set limits menu

*) Door Sensor 2, inactive
Closed loop at present

9) Door Sensor 1, Cryotank; R126C,
Remote alarm triggered

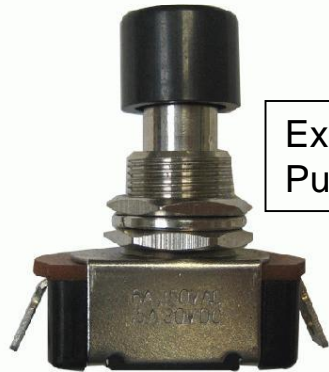
4) -20 CRO; R126B, L=-30C, H=-10C

3) Coldroom; R126A, L=-2C, H=10

2) -20; R126D, L=-30C, H=-5C

1) -80; R126D, L=-90C, H=-55C

Lab Systems: Alarm dialer, Theft Prevention, Series Switch Circuit

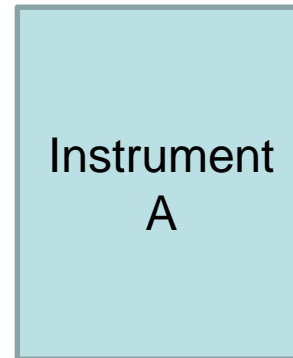
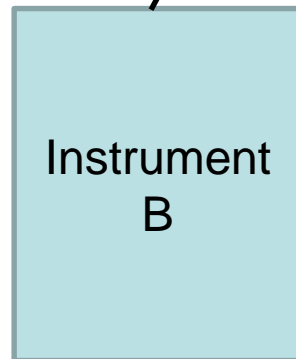
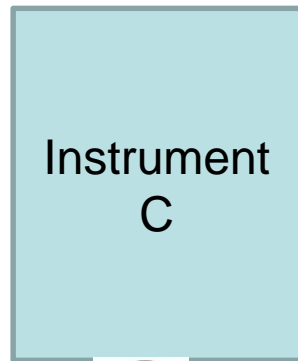


Example: Miniature Push button switch

Existing Alarm Dialer



Circuit Broken if instrument is moved, triggers dialer "open door" alarm



Lab Systems: Millipore, BRDG, Milli-Q, Type 1



Type 1

Ultrapure water

Milli-Q® water

18.2 MΩ·cm@25°C

TOC < 10 ppb



Type 2

Pure water

Elix® water

>5 MΩ·cm@25°C

TOC < 30 ppb



[*Link to Milli-Q Brochure, Specs...pdf*](#)

Pure and ultrapure water is available directly from tap water (no need to have a DI source in the lab). Consistent production of superior quality pure water (better than twice the quality of distilled water) without the need to regenerate a DI tank, thanks to patented Elix technology.

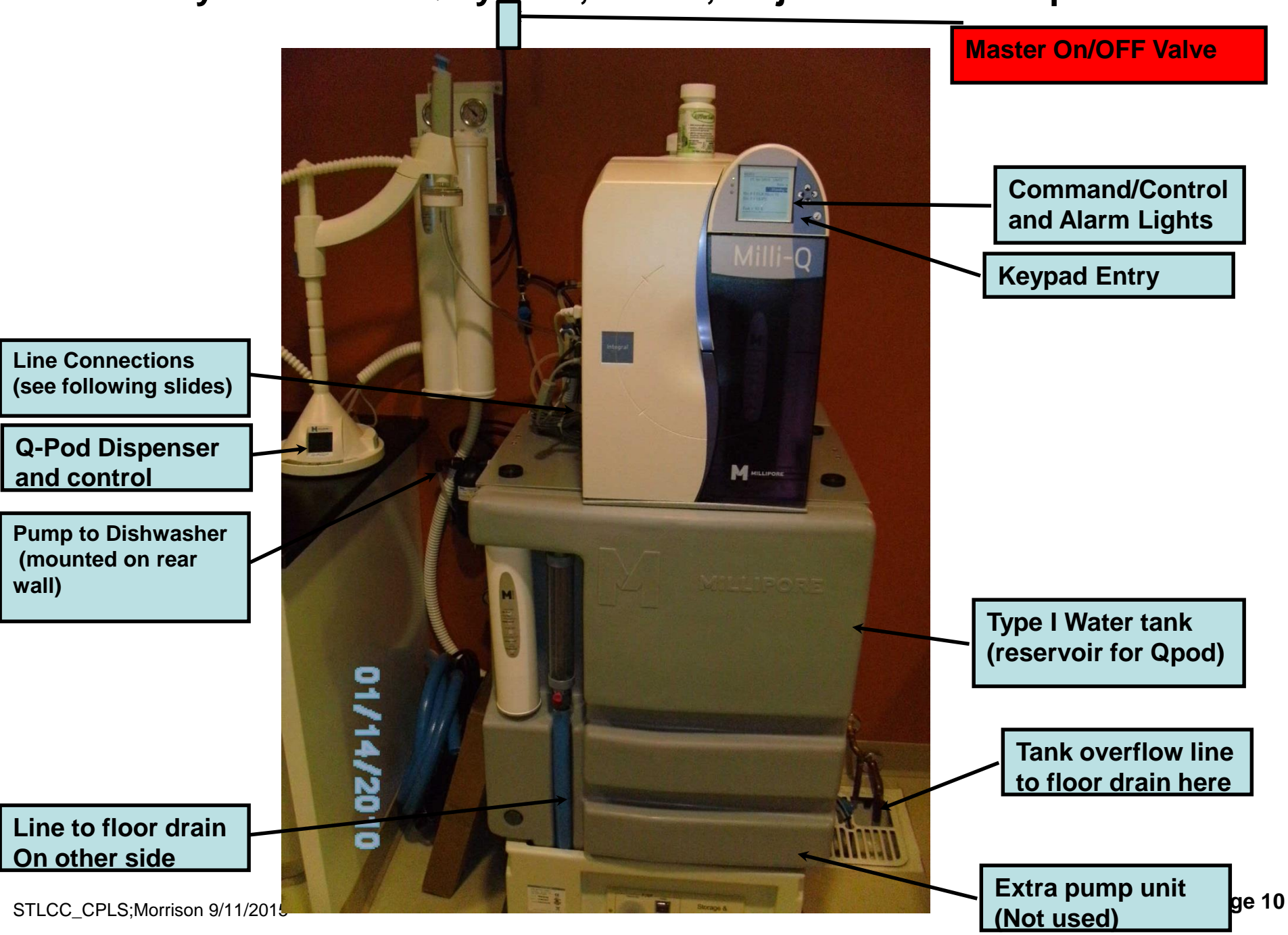
Applications

When the system is equipped with a 0.2 µm filter, the high purity water delivered by the system is suitable for HPLC, LC-MS, MALDI-ToF-MS, IC, ICP, AA and most of the analytical techniques commonly used in the laboratory. When an ultrafiltration cartridge (BioPak) is utilized at the point-of-use, the water is suitable for genomics applications (quality at least equivalent to DEPC-treated water) and cell culture. The water produced following the system's pretreatment step may be used for basic laboratory needs, such as buffer and reagent preparation, microbiology media preparation, histology, dissolution testing (with UV detection) and rinsing of glassware.

Millipore's tech support team (800 645-5476, Option3, then ext. 8066) can often troubleshoot problems over the phone. Have the system serial number available: F9EN98309B. If service is required, call 800-645-5478 to log a request. Note, a credit card# or PO# is required so you may need to ask for a quote on anticipated services, prepare a Req using the quote, and then schedule service when the PO# is available. (Updated 12/10/13). Our local sales Rep Richard Goldstein may be able to help. Cell 314-800-4775

[*Link to Millipore System User Manual ...pdf*](#)

Lab Systems: Milli-Q System, BRDG, Major Control Components



Lab Systems: Milli-Q System, Filters

(Detect text box to jump to detail instructions)

Water Feed line
Strainer @ 1yr

MILLIPAK EXPRESS 40
MPGPC4001
@ ~150-180 days

PrePak Filters
PRPK00001US
Maint @ 90 days

SDSELix Filter
vent to floor drain
TANKVNT02

Sanitization Port
Effersan tablet
4 g tablets @ 1 month
Sodium dichloro-S-Traizinetriene
Order from Fisher Sci not Millipore

Quantum filters
RO membrane
QTUMOTEX1
Maint @ 1 year

Progard filters
PROG0T0S2US
Maint @ ~150-180 days



Lab Systems: BRDG, Milli-Q System, Lamps

(Detect text box to jump to detail instructions)



**UV 185 nm Lamp
ZMQUVLP01
Maint @ 1-2 yrs
(remove left side
door to access)**

**ASM UV (254nm)
ZLXUVLPL1
Maint @ 1 -2 yrs
(rear of unit,
inside 5" blue cap
to tank)**

**UV 254nm
ZLXUVLP01
Maint @ 1-2 yrs
(remove right side
door to access)**

**A10 UV Lamp
ZFA10UVM1
(internal behind
Quantum and door)
Maint @ 1-2 yrs**

Lab Systems: Millipore, BRDG, Filters, Internal Views

(Detect text box to jump to detail instructions)



**Progard filters
PR0G0T0S2US
Maint @ 150-180 days**

**Quantum filters
RO membrane
QTUMOTEX1
Maint @ 1 year**

**System Information:
Cat# ZRXQ015T0
SN: F9EN98309B
Manf.Date: 5/27/2009**

Lab Systems: MilliQ Integral Consumables, Annual Maintenance in mid-September, Order parts in July recommended

| Catalogue Number | Description | Qty | Unit Net Price (\$) | Total Net Price (\$) |
|-------------------------------------|------------------------------|-----|---------------------|----------------------|
| 1. ZFA10UVM1 | A10 UV LAMP | 1 | 539.63 | 539.63 |
| 2. ZLXUVLP01 | UV LAMP FOR ELIX UV | 1 | 192.92 | 192.92 |
| 3. ZMQUVLP01 | UV LAMP FOR MQ CENTURY | 1 | 414.96 | 414.96 |
| 4. ZLXUVLPL1 ASM UV wo/Cable | | 1 | 238.42 | 238.42 |
| 5. MPGP04001 | MILLIPAK EXPRESS 40 (1/PK) | 1 | 150.15 | 150.15 |
| 6. TANKVNT02 | SDS TANK ELIX VENT FILTER | 1 | 369.46 | 369.46 |
| 7. PR0G0T0S2US | PROGARD TS2 W/O | 1 | 341.25 | 341.25 |
| 8. QTUM0TEX1 | QUANTUM TEX CARTRIDGE (1/PK) | 1 | 334.88 | 334.88 |
| 9. FREIGHT | Freight charges | 1 | 38.00 | 38.00 |
| Total (\$) | | | | 2,619.67 |

Quote Expiration: 7/31/2012

Please ensure that you add our Quote Reference (R-01003836A) to your official order to guarantee that your goods are shipped at the agreed price.

Effersan Tablets for RO cleaning, Fisher Sci order info

| Catalog No. | Description | Price per Unit |
|-------------|-----------------------------------|--|
| NC0539170 | EFFERSAN 100 TABS | <input checked="" type="radio"/> Each for \$112.28 |
| No.:0045015 | | |

Lab Systems: Millipore, Revised Ordering Process 2/1/13

via EMDMillipore.com

1. www.EMDmillipore.com Logon: Bmorrison@stlcc.edu , Password: 15millipore
2. Locate Product, add to cart, proceed to checkout, Enter our Quote Ref#: R-00938658A
3. Verify/modify shipping address/contact info, Submit
4. Receive Email with RFQuote info, wait for response from local rep, then send to Angi to order.

Order Complete | EMD Millipore

https://www.emdmillipore.com/is-bin/INTERSHOP.enfinity/WFS/Merck-US-Site/en_CA/-/USD/ViewCheckout-Dispatch

Visit EMD Millipore Home | Visit Millipore | You are on EMD Millipore Chemicals | Performance Materials | EMD Group

Logout | You are logged in as Bmorrison@stlcc.edu

Search product, CAS, keyword, ...

Continue shopping on EMD Millipore Chemicals | Continue shopping on Millipore

EMD Chemicals

New Products

All Products

more

Thank you!

Your Request No.: **R00204674** PDF

You will shortly receive an email acknowledgment for your price request. Customer Service will contact you soon to offer you pricing for your requested products.

- Save these products as a shopping list
- Order history
- Continue shopping
- Logout

MSDS are available for all EMD Millipore products:

- MSDS Quick Search

For general questions please contact our Customer Service:

EMD Millipore
290 Concord Road
01821 Billerica, MA
United States
Phone: 781 533-6000
Fax: +49 6151 72 2000
E-mail: Customer.CareDesk@emdchemicals.com
[Contact us](#)

Add to Favorites

Add the items you ordered to your favorites.

- ☒ Progard S2 pre-treatment pack (US, Canada and Mexico only) (PR0G0T0S2US)
- ☒ Select all

[Add to Favorites](#)

Other customers were also interested in

| | | |
|--|--|---|
| Vent Filter for 30/60/100L PE reservoirs with E... | Quantum TEX (Organex Resin) Cartridge Filter | Millipak Express 40 Filter Unit, 0.22 µm... |
| Get more information | Get more information | Get more information |

Customer.CareDesk@emdchemicals.com
Acknowledgment no. R00204674 of Your Price Request ...
EMD Millipore USA
Thank you for your interest and for requesting a

St. Louis Community College
1005 N. Warson Rd
63132 Creve Coeur
United States
MO

Web Request Confirmation: R00204674 - 01 Feb 2013

For general questions please contact our Customer Service:

EMD Millipore
290 Concord Road
01821 Billerica, MA
United States
Phone: 781 533-6000
Fax: +49 6151 72 2000
E-mail: Customer.CareDesk@emdchemicals.com

Millipore products

| Product | Qty/Pk | Quantity | Price USD |
|--|--------|----------|------------------|
| Progard S2 pre-treatment pack (US, Canada and Mexico only) (PR0G0T0S2US) | 1 | 1 | price on request |

Request Total price on request

Lab Systems: Previous Process, Millipore Service/Parts

System Information: Cat# ZRXQ015T0, SN: F9EN98309B, Manf.Date: 5/27/2009

Per RN 1/19/11 We will not extend warranty beyond 2/1/11 letter offer.

Future service calls: A representative will be able to set up a billable repair for the system(s). (800) 645-5476 ext. 8066 or 8198

Kelley Dennehy, Maintenance Contract Sales Representative II

kelly.dennehy@merckgroup.com www.millipore.com ([dispatcher](#)) eric.bergmann@merckgroup.com (technician)

SERVICE CALL PROCESS:

- Setup a temporary PO# to give the Technical Service dept and/or their rep when he is onsite. Use CPLSDate such as: CPLS15Sep11 After service call, we'll be given an invoice to pay with our normal PO process, Referencing invoice.

For Parts/Filters: Use Millipore.com, find part, Request Info, then Submit email to local Agent, wait for email response, send Quote to Angela Taylor for processing.

Our Ref R-00938658A February 1, 2012 Quotation Catalogue Number Description Qty Unit Net Price (\$)

1. PR0G0T0S2US PROGARD TS2 W/O 1 341.25 341.25

Please ensure that you add our Quote Reference (R-00938658A) to your official order to guarantee that your goods are shipped at the agreed price. Kelley Dennehy, Maintenance Contract Sales, Corporate (781) 533-3597. kelly.dennehy@merckgroup.com

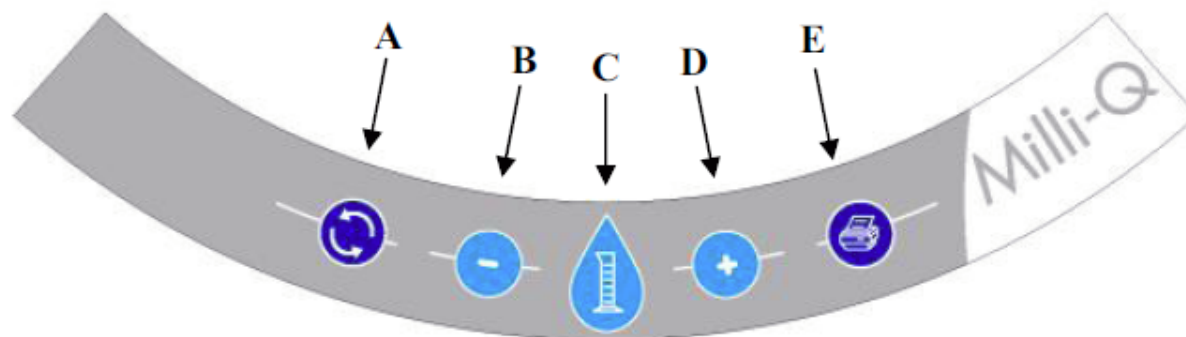
| Item | Maintenance needed | When |
|----------------------|--------------------|-------------------------------------|
| UV 185 nm Lamp | Replacement | When prompted to by an LCD message. |
| UV 254 nm Lamp | Replacement | When prompted to by an LCD message. |
| A10 TOC Monitor Lamp | Replacement | When prompted to by an LCD message. |

NOTE:

- It is recommended to have a Millipore Field Service Representative change the various lamps in the system.
- The replacement of these lamps involves removing the cover of the system. The instructions for replacing these lamps are not included in this User Manual. The instructions are included with the replacement lamp.

Lab Systems: Millipore, Q-Pod, Volumetric Dispensing

The Q-POD Keypad is shown and explained here.



Volumetric Dispensing:

1. Press “A” button to start Water recirculation (see note below)
2. Press “B” or “D” button to set/adjust desired volume
3. Make sure container of adequate size is below spout
4. Press “C” (graduated cylinder symbol) to begin flow
5. When flow has stopped, use push-button on spout to top-off if needed

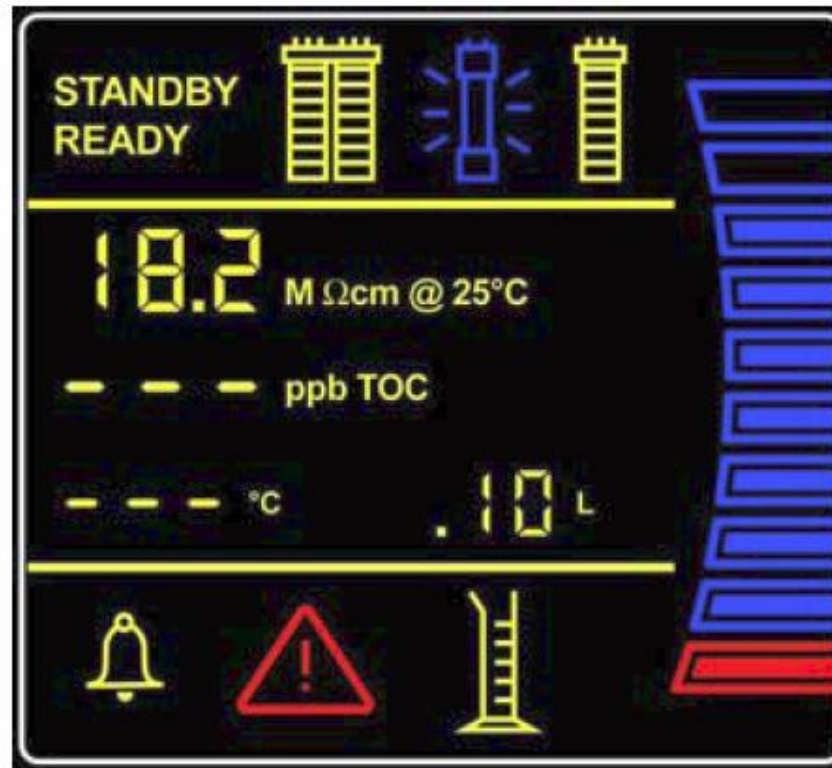
Note: Recirculation “A” can take 3 minutes, generally raises quality of water before dispensing.

[*Link to Millipore System User Manual ...pdf*](#)

Lab Systems: Millipore, Q-Pod Display

Ready: Normal mode
Standby: Maintenance mode

Progard Status Level
UV Lamp Status
Quantum Filter Status Level



Processed Water Level in Tank (reservoir for Q-Pod)

Blinking: Q-Pod not ready

If Blinking, Maintenance or Alarms
Need to be addressed

Q-Pod ready for volume
dispensing

8.50 x 11.00

Lab Systems: Millipore, Elements-Function

Progard Pack

- The Progard Pack protects the RO Cartridge in order to increase its lifetime.
- The Progard Pack prevents mineral scaling, organic fouling and chlorine oxidation of the RO Cartridge(s).

| Item | Description |
|------------------------------------|--|
| Progard Pack | Performs benefits listed above. |
| Progard Pack without Polyphosphate | <ul style="list-style-type: none">• Performs benefits listed above except it does not prevent mineral scaling.• This is used with feedwaters not having tendencies to form mineral scale. |

UV 254 nm Lamp

- The UV 254 nm Lamp emits light at 254 nm.
- The UV 254 nm Lamp is used to kill bacteria.

UV 185 nm Lamp

- The dual wavelength UV 185 nm Lamp emits light at 185 nm and at 254 nm.
- The UV 185 nm Lamp kills bacteria and reduces the level of organic molecules in the water.

Quantum Cartridge

The Quantum Cartridge removes trace levels of ions and organic molecules.

| Item | Description |
|-----------------------|--|
| Quantum TIX Cartridge | <ul style="list-style-type: none">• The Quantum TIX Cartridge contains only ion exchange resin.• This type of Quantum Cartridge is used when maintaining absolutely trace levels of ions is critical. |

Lab Systems: Millipore, Specs-Water Delivered

itions and requirements

r The water delivered from a Q-POD Unit has the following characteristics.

| Parameter | Specification | Units |
|--------------------------|---------------|-----------------|
| Resistivity | 18.2 | MΩ.cm @25°C |
| TOC | < 5 | ppb |
| Particulates > 0.22 μm** | < 1 | Particulates/mL |
| Bacteria** | < 1 | cfu/mL |
| Pyrogens* | < 0.001 | Eu/mL |
| RNases* | < 0.01 | ng/mL |
| DNases* | < 4 | pg/μL |
| Flow Rate** | 0.05 – 2 | L/min |

(*) With BioPak Final Filter

(**) With Millipak or BioPak Final Filter

NOTE:

Lab Systems: MilliQ, Lab Water Types and Specs

| | |
|---------------|--|
| Type 3 | Type 3 water is the lowest laboratory water grade, recommended for glassware rinsing, heating baths and filling autoclaves, or to feed Type 1 lab water systems. |
| Type 2 | Type 2 water is the grade used in general laboratory applications such as buffers, pH solutions and microbiological culture media preparation; as feed to Type 1 water systems, clinical analyzers, cell culture incubators and weatherometers; and for preparation of reagents for chemical analysis or synthesis. |
| Type 1 | Type 1 water is the grade required for critical laboratory applications such as HPLC mobile phase preparation, blanks and sample dilution in GC, HPLC, AA, ICP-MS and other advanced analytical techniques; preparation of buffers and culture media for mammalian cell culture and IVF; production of reagents for molecular biology applications (DNA sequencing, PCR); and preparation of solutions for electrophoresis and blotting. |

| Contaminant | Parameter and unit | Type 3 | Type 2 | Type 1 |
|--------------|----------------------------------|--------|--------|--------|
| Ions | Resistivity (MΩ•cm @ 25°C) | >0.05 | >1.0 | >18.0 |
| Organics | TOC (ppb) | <200 | <50 | <10 |
| Pyrogens | (Eu/ML) | NA | NA | <0.03 |
| Particulates | Particulates > 0.2 µm (units/mL) | NA | NA | <1 |
| Colloids | Silica (ppb) | <1000 | <100 | <10 |
| Bacteria | Bacteria (cfu/mL) | <1000 | <100 | <1 |

These values are only guidelines, as some specific laboratory applications may require a quality superior to the quality indicated by the norms. For instance, several molecular biology applications require Type 1 water that is both RNase-free and DNase-free; elemental trace analysis at sub ppt levels requires water of a higher purity than regular Type 1 water; and glassware washing may require pyrogen-free water for some experiments. Millipore has done extensive research into laboratory water applications. This information, compiled as internal research notes or references to scientific articles, is provided on demand by our Application Specialists. (Visit www.millipore.com/offices to find your nearest contact).

Different published norms define the quality required for specific laboratory water applications: ASTM® and ISO® 3696 for laboratory applications; CLSI guidelines for clinical laboratories. Some laboratories will also use norms defined in the European or the US Pharmacopoeia.

Lab Svstems: MilliQ. TOC Monitor A10

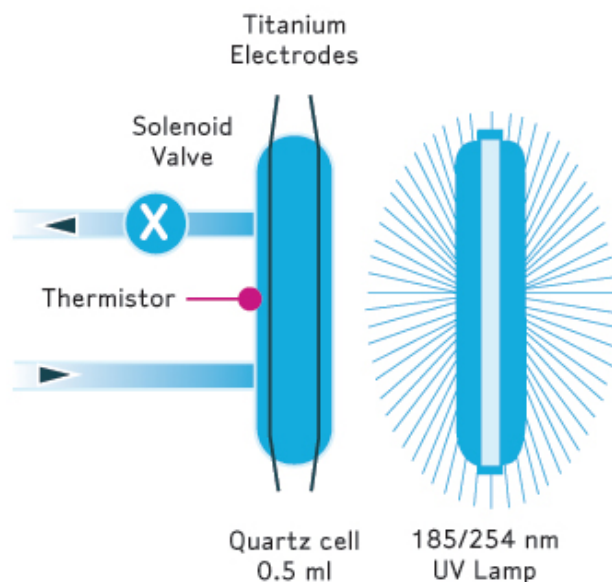
Millipore TOC Monitors

The Millipore A10 TOC monitor contains a 0.5 ml quartz cell in which ultrapure water is captured. When the A10 UV lamp is powered on, photocatalytic oxidation of the organic compounds occurs. The final end product of the organic oxidation is carbon dioxide, which dissolves in the water, causing a conductivity increase. This change in conductivity is regularly monitored by the titanium electrodes (patented design) and temperature-compensated to 25 °C. A set of complex algorithms confirms complete oxidation and calculates the carbon level associated with this conductivity change.

Millipore TOC monitors are available as stand alone units or integrated within some Milli-Q and Elix water purification systems.

The TOC monitor design offers several benefits:

- » As the oxidation and conductivity measurement occurs in the same cell, the instrument checks that all organics have been oxidized, and that a stable conductivity value has been reached before delivering a TOC value. Otherwise, the A10 monitor will indicate that it did not succeed in oxidizing all organics and will start a new test.
- » The A10 TOC monitor is able to detect TOC values over a range of 1 to 999 ppb TOC, with an accuracy of ± 1 ppb or 15 %, whichever is greatest.
- » Each A10 TOC monitor is calibrated for resistivity around two values: 18.0 M Ω ·cm @ 25 °C and 1 M Ω ·cm @ 25 °C, and for TOC with methanol over a range between 1 and 200 ppb TOC. The calibration results of each TOC monitor are delivered with the instrument. "
- » Millipore A10 TOC monitors meet the requirements for the performance of suitability tests as described in USP § 643. These tests can be performed with the support of Millipore Service Engineers.
- » Millipore A10 TOC monitors provide an accurate measure of the TOC value in the ultrapure water produced and therefore a warranty of the quality of that water.



A10 TOC Monitor Photooxidation Cell

The A10 TOC monitor contains a quartz cell. Water flows through a channel at the base of the cell and then exits through a solenoid valve at the top. Titanium electrodes in the cell allow conductivity to be measured; a thermistor on the side measures temperature. A 185 /254 nm UV lamp located next to the cell can emit UV light.

Lab Systems Millipore, RO Sanitize/Clean(CL2,pH) @90 days

Basic RO CL2 Cleaning, done about every 90 days

- Go to Menu, then to Standby Mode
- Open the Sanitizing Port cap on top
- Drop in a new Chlorine ***Efferson tablet*** and replace cap
- Select Menu, then Standby Menu
- In Standby Menu select “Sanitize and Clean” → then →RO CL2 Cleaning
- Press check mark to initiate 19 minute cleaning procedure
- System should return to READY mode when finished.

If required, proceed to the RO pH procedure

- Open the Sanitizing port
- Place a ROClean A or ROCleanB pouch on the top of the port opening
- Replace the Cap
- Go to Standby Mode, then Standby Menu, Sanitize Clean, then RO pH Cleaning
- Press check to start the 142 minute cleaning process
- System will return to ready mode when finished.
- Remove the used pouch next time you open the Sanitizing port.

Lab Systems: Water, PrePak Filters, Milli-Q ,90 -120 days




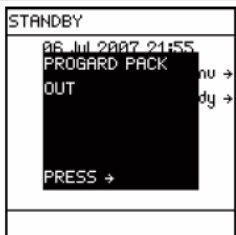





1. Turn off (horizontal) water supply, yellow valve above unit
2. Remove plastic cover plate on top of filters
3. Use flat head screw driver to remove retaining clip by pushing up (vertically) on it.
4. Remove PrePak filter by pulling directly toward you
5. Remove existing O-rings if they are still on the filter stem (new O-rings should be on the new PrePak filter)
6. Write date on new PrePak filter
7. Install new PrePak filter by pushing in complete
8. Secure the retaining clip by pushing it down on the pin
9. Replace plastic cover plate on top of unit
10. Turn water supply valve on slowly to test for leaks. Leave in full on position

Lab Systems: Millipore, Progard Filter Maint, @ 150-180 days

Remove old Filter





Replace with New Filter

| Step | Action | Diagram |
|------|--|---|
| 1 | Place the system into STANDBY Mode. |  |
| 2 | <ul style="list-style-type: none"> Open the Milli-Q System left door. Lift up the Pack Locking Handle. |  |
| Step | Action | Diagram |
| 3 | Remove the used Progard Pack. |  |
| 4 | The system will indicate that the Progard Pack is removed in a few moments. |  |

| Step | Action | Diagram |
|------|---|--|
| 1 | <ul style="list-style-type: none"> Remove the covers on the 2 ports of the Progard Pack. Look inside the ports. Make sure the rubber O-rings are firmly in place. Wet the O-rings with water. |  |
| 2 | <ul style="list-style-type: none"> Push the top of the Progard Pack into the ports on the Milli-Q System. Push on the bottom of the Progard Pack. |  |
| 3 | <ul style="list-style-type: none"> Push the Pack Locking Handle down. Close the left door. |  |

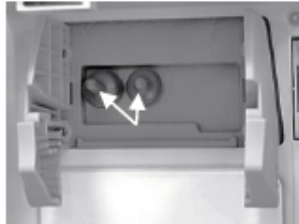


Lab Systems: Millipore, Progard and Vent @150 days

The New Progard Filter Must Be Flushed before use, follow this procedure

| Step | Action | Diagram |
|------|---|---|
| 1 | When a new Progard Pack is installed, the LCD looks like this. |  <p>INSTALL PROGARD A new Progard has been installed. Catalogue N° : PR060T002 Lot N° : F6DN27324. Press → to start Progard Flush.</p> |
| 2 | Press  . |  <p>INSTALL PROGARD Progard Flush procedure in progress. Remaining Time= XX min. Press → to cancel.</p> |
| 3 | When the Progard Pack flush has finished, the Milli-Q System goes to READY Mode. |  <p>READY 03 Jul 2007 22:49 Menu → Standby → Elix R : 12.5 MΩ/cm TC Elix T : 25.1°C Tank : 20.0 %</p> |


Also replace the Reservoir (Tank) VENT filter when the Progard is done

Lab Systems: Millipore, Quantum Pack, BRDG Annually September

| Step | Action | Diagram |
|------|---|---|
| 1 | <ul style="list-style-type: none"> • Open the right door of the Milli-Q System Cabinet. • Remove the 2 protective caps located on the ports inside. |  |
| 2 | <ul style="list-style-type: none"> • Remove the covers on the 2 ports of the Quantum Cartridge. • Wet the O-rings with water. |  |
| 3 | <ul style="list-style-type: none"> • Install the Quantum Cartridge until it is fully seated. • Close the right door. |  |
| 4 | One minute later, the Main LCD shows that a new Quantum Cartridge is installed. | <div>INSTALL QUANTUM</div> <div>A new Quantum has been installed.</div> <div>Catalogue N° : 9TUMATEX1</div> |

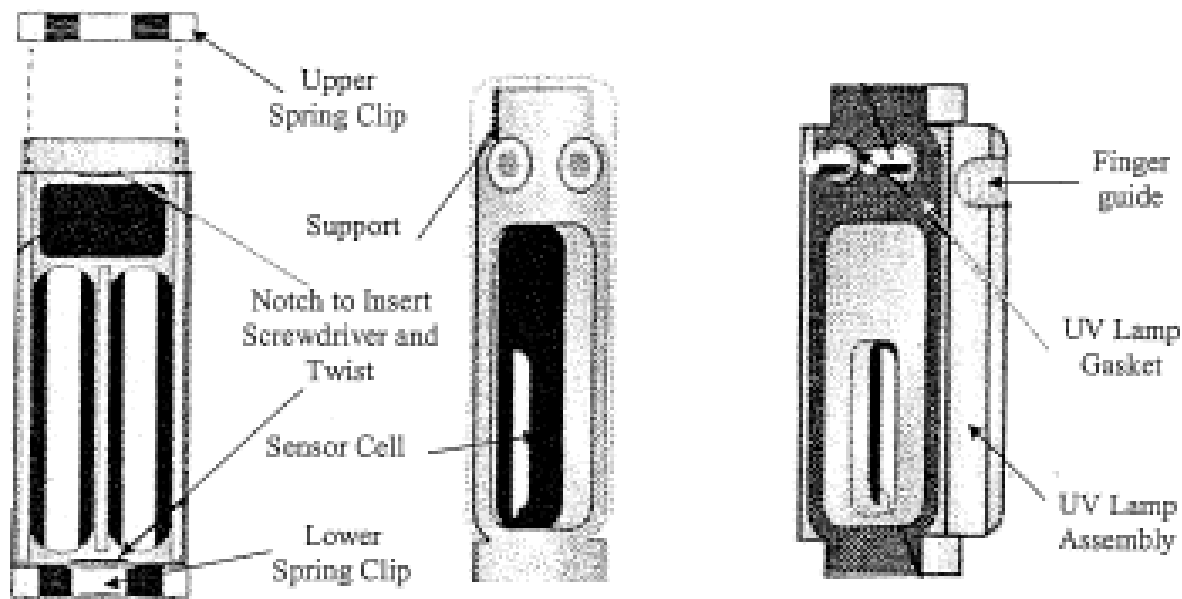
8.50 x 11.00 in

Lab Systems: Milli-Q , A10 UV Lamp, pg 1/3

| Step | Action |
|------|---|
| 1 | Hold the UV lamp assembly and cover the upper spring with one hand, insert the screwdriver blade into the notch immediately below the clip. |
| 2 | Gently twist the screwdriver to release the upper spring clip and remove it. |
| 3 | Remove the lower spring clip. Remove 2 screws from Metal cover plate and remove plate |
| 4 | Grasp the UV lamp assembly by the finger guides and pull it out of its support. |
| 5 | Install the new UV lamp gasket on the UV lamp assembly. <div style="text-align: center;">  Attention Located inside the opening to the A10 window Be careful not to touch the sensor cell inside the support. </div> |
| 6 | Insert the new UV lamp assembly into its support. |
| 7 | Secure the UV lamp assembly in place using the two new spring clips. |

**Note: Requires
Torx -10, -20,
and flathead
screwdrivers**

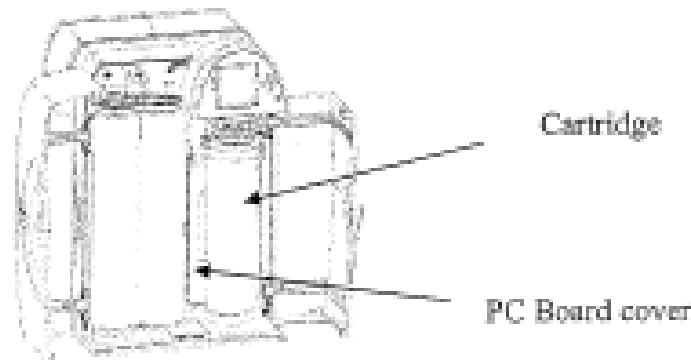
8 Replace Metal cover plate



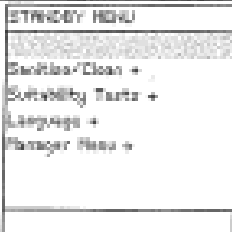
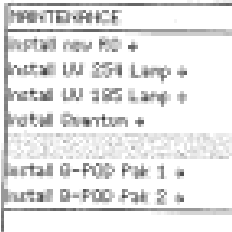
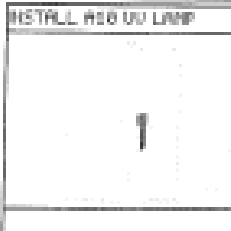
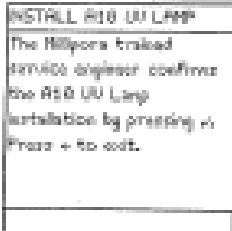
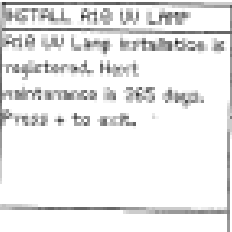
Lab Systems: Milli-Q , A10 UV Lamp, pg 2/3

The procedure involves the replacement of the UV lamp assembly and then a reset of the software timer.

| Step | Action |
|------|--|
| 1 | Place the system into STANDBY mode. |
| 2 | Depressurise the water system by pushing the Q-POD [®] plunger down and releasing it. Do this again once water stops flowing out. |
| 3 | Unplug the power cord. |
| 4 | Remove the Quantum cartridge. |
| 5 | Remove the PC board cover. |
| 6 | Locate the UV lamp assembly behind the cartridge. |
| 7 | Remove and replace the UV lamp assembly using the procedure page 1 of 4. |
| 8 | Put the PC board cover back on. |
| 9 | Install the cartridge. |
| 10 | Plug in the power cord. |
| 11 | Place the system into the READY mode. |
| 12 | Start an A10 Cleaning. , takes 60 minutes |




Follow the steps below to reset the UV Lamp timer.

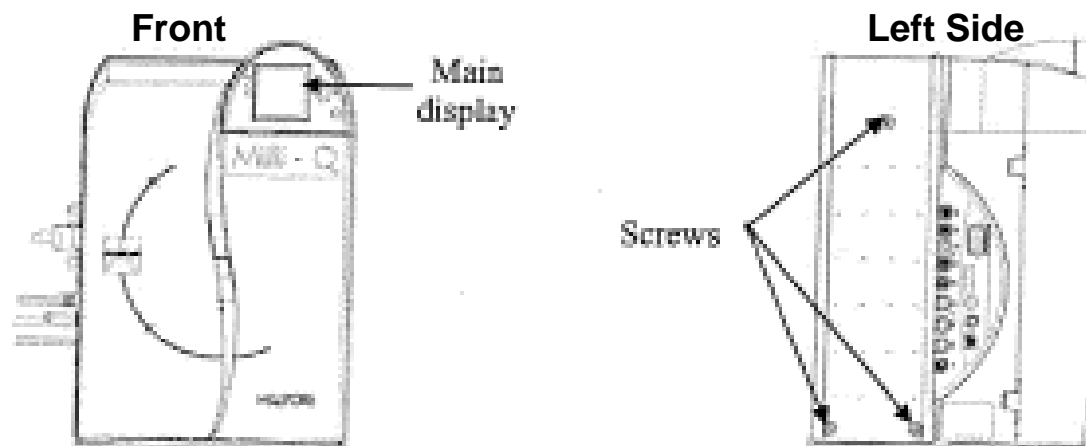
| Step | Action | Display |
|------|--|---|
| 1 | Select the Maintenance menu. |  |
| 2 | Select the Install A10 UV Lamp menu. Press the right arrow. |  |
| 3 | The location of the UV lamp assembly appears. Press the right arrow. |  |
| 4 | Follow the LCD instructions. |   |

Lab Systems: Milli-Q, A10 UV Lamp, pg 3/3

Lab Systems: Milli-Q ,UV 185NM Lamp, pg 1/2

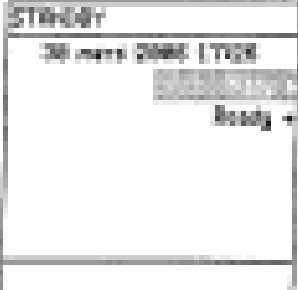
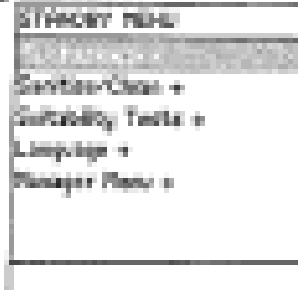
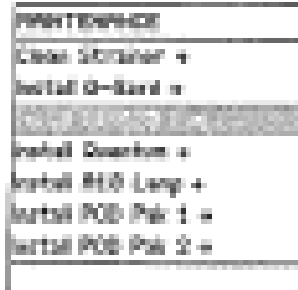
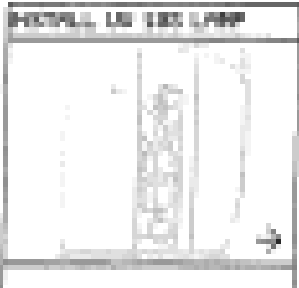
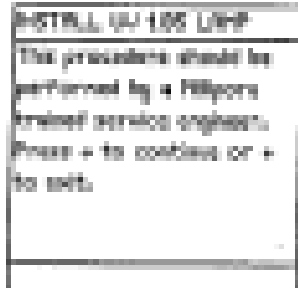
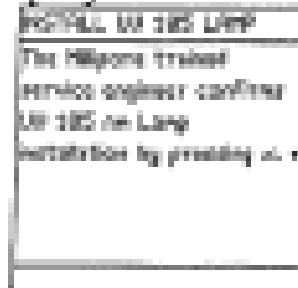
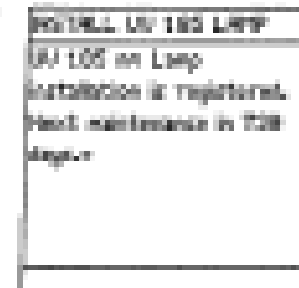
| Step | Action |
|------|--|
| 1 | Place the Milli-Q system into STANDBY Mode . |
| 2 | Depressurize the Milli-Q system |
| 3 | Unplug the power cord. |
| 4 | Remove the left side cover. |
| 5 | Locate the UV Lamp and its cable. Pull the UV Lamp slightly out from its housing. |
| 6 | Disconnect the UV lamp connector. Remove the UV Lamp. |
| 7 | Install the new UV Lamp. Be sure to wear the gloves that are provided with the replacement UV Lamp. Avoid getting fingerprints on the replacement UV Lamp. |
| 8 | Install the new UV Lamp back into the housing inside the system. Plug in the UV Lamp connector. <div style="text-align: center;">  Attention </div> <p>It is very important to keep the UV Lamp perfectly vertical at all times that it is being moved into or out of the housing. This will avoid the possibility of breaking the UV Lamp.</p> |
| 9 | Screw the left side cover back on. |
| 10 | Plug in the power cord. |

**Note: Requires
Torx -10, -20,
and flathead
screwdrivers**



Resetting the UV Lamp Timer

Follow the steps below to reset the UV Lamp timer.

| Step | Action | | | |
|------|--|---|--|--|
| 1 | In STANDBY Menu, go into Maintenance. | | | |
| |  |  |  | |
| 2 | Follow instructions on the Main Display. | | | |
| |  |  |  |  |

Lab Systems: Milli-Q , UV 254nm Lamp, pg 1/2

Before you begin

Perform the steps below before replacing the UV Lamp.

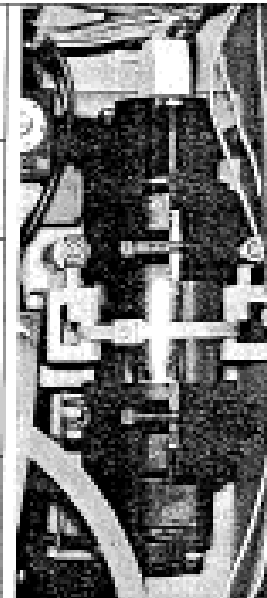
| Step | Action |
|------|---|
| 1 | Place the water system in Standby Mode. |
| 2 | Depressurize the water system. |
| 3 | Unplug the power cable. |
| 4 | Remove the right side cover. |

**Note: Requires
Torx -10, -20,
and flathead
screwdrivers**

Replacing the
UV 254 nm
lamp

Follow the steps below to replace the UV Lamp.

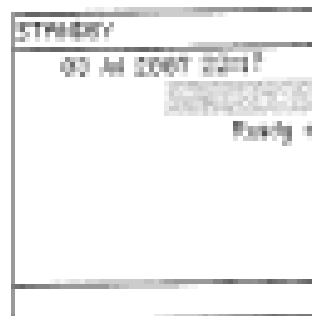
| Step | Action |
|------|--|
| 1 | <ul style="list-style-type: none">• Locate the UV Lamp and its cable.• Pull the UV Lamp slightly out from its housing. |
| 2 | <ul style="list-style-type: none">• Disconnect the UV lamp connector.• Remove the UV Lamp. |
| 3 | Install the new UV Lamp. Be sure to wear the gloves that are provided with the replacement UV Lamp. Avoid getting fingerprints on the replacement UV Lamp. |
| 4 | <ul style="list-style-type: none">• Install the new UV Lamp back into the housing inside the system.• Plug in the UV Lamp connector. |
| 5 | Screw back the right side cover. |
| 6 | Plug in the power cord. |



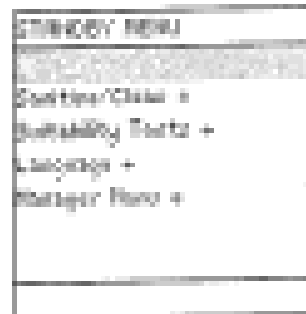
Lab Systems: Milli-Q , UV 254nm Lamp, pg 2/2

Registering the
UV lamp timer

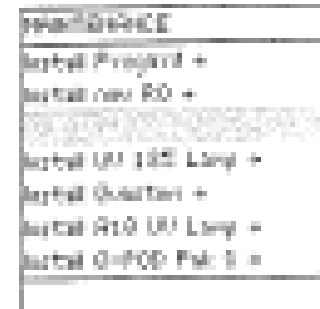
Follow the system screens. Start in Standby Mode.



Press



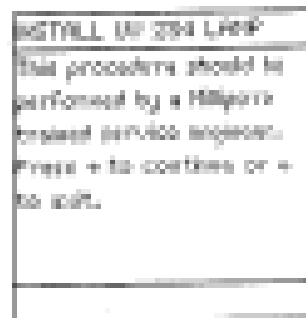
Press



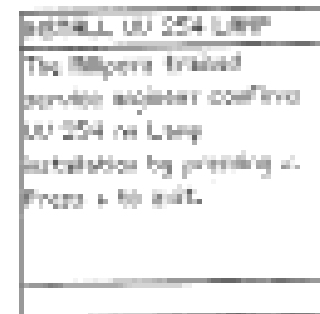
Press



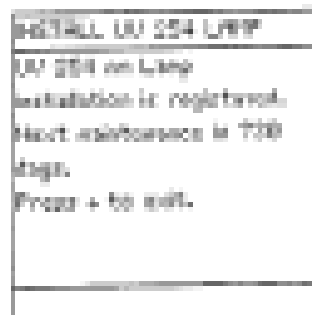
Press



Press



Press



Press 3 times on



Lab Systems: Millipore, Tank Sanitizing Module (ASM)

ASM TANKASMIN, Lot F9JN60055

UVLamp (254nm) Dec09-Sep12

Germicidal Action

ZLXUVLPL1

90-98-L28



4m Connects to
left side panel of
Main module with
8 pin connector




Automatic Sanitization (ASM)

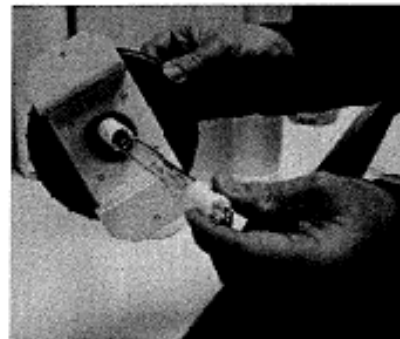
The ASM (Automatic Sanitization Module) is a device that limits efficiently the development of a biofilm inside the tanks. The ASM illuminates the inside of the Millipore tanks using a 254 nm low pressure mercury vapor UV lamp, selected for its germicidal effectiveness.

The automatic illumination of the air, water and inner surfaces of the tanks occurs at regular intervals that can be programmed by the user in relationship with the regular operation of the laboratory.

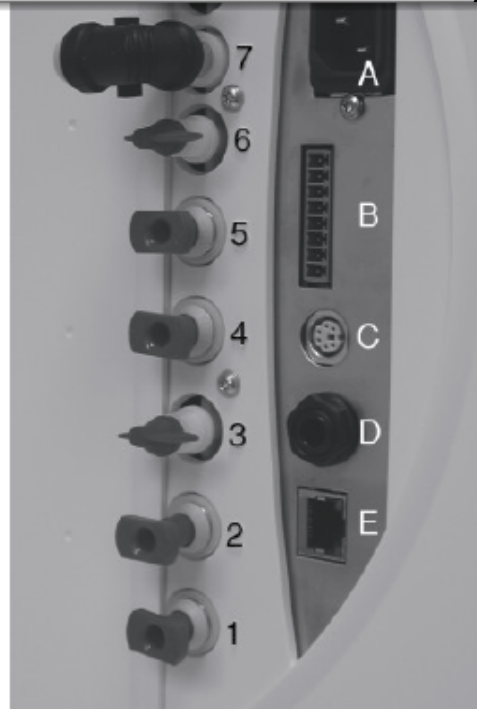
Lab Systems: Milli-Q ASM UV ZLXUVLPL1 pg 1/1

| Step | Action |
|------|---|
| 1 | Place the Water System into STANDBY Mode. |
| 2 | Turn off the Water System electrical power. |
| 3 | Locate the ASM on the top of the reservoir or SDS. Locate the box housing the electronic components that power the ASM Lamp. |
| 4 | Remove this box by unscrewing the 2 screws that hold it to the rest of the ASM. |
| 5 | Carefully remove the cable that goes to the actual ASM UV Lamp. It is the cable that plugs into the top of the ASM UV Lamp. |
| 6 | Remove the used ASM UV Lamp from its Quartz Sleeve inside. The Quartz Sleeve is the glass sleeve that holds the actual UV Lamp inside the Stainless Steel Housing. <div style="text-align: center;">  Attention </div> Pull the UV Lamp straight out until it is completely removed. If this is not done, then there is a risk of breaking the Quartz Sleeve located inside. |
| 7 | There might be one or two small rubber sleeves that come out with the used UV Lamp. These can be discarded. These are only used for transport purposes so the UV Lamp can not break. |
| 8 | Install the new UV Lamp into the Quartz Sleeve. Use the supplied gloves so fingerprints do not get on the UV Lamp. |
| 9 | Plug the electrical cable into the 4 pins on top of the UV Lamp. |
| 10 | Screw the electrical box back onto the ASM. |
| 11 | Reset the ASM UV Lamp Timer in the Software. Refer to the Service Manual for your system for more information. |

Illustrations



Lab Systems: Millipore, Connections (Left side of Milli-Q unit)

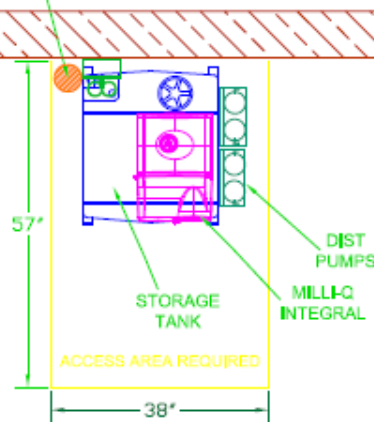


| Item | Description | Item | Description |
|------|--------------------------------|------|---|
| 1 | RO Reject Port | 8 | E-POD™ Unit (Accessory) Port |
| 2 | Feedwater Port | 9 | Reservoir Port |
| 3 | Port for RC-Link to Q-POD Unit | A | Power Entry connection (100 – 240 V) |
| 4 | Port for RC-Link to Q-POD Unit | B | Accessories connection (maximum 24 VDC) |
| 5 | E-POD Unit (Accessory) Port | C | PS/2 cable connection (maximum 5 VDC) |
| 6 | EDI Waste Port | D | Level Sensor (maximum 5 VDC) |
| 7 | Reservoir Port | E | Ethernet connection (maximum 5 VDC) |

Lab Systems: Water Purification, Milli-Q, Spec Sheet

PREFERRED LOCATION FOR
DRAIN, FOR INTEGRAL REJECT
AND TANK OVERFLOW

PLAN VIEW



UTILITY REQUIREMENTS (BY OTHERS):

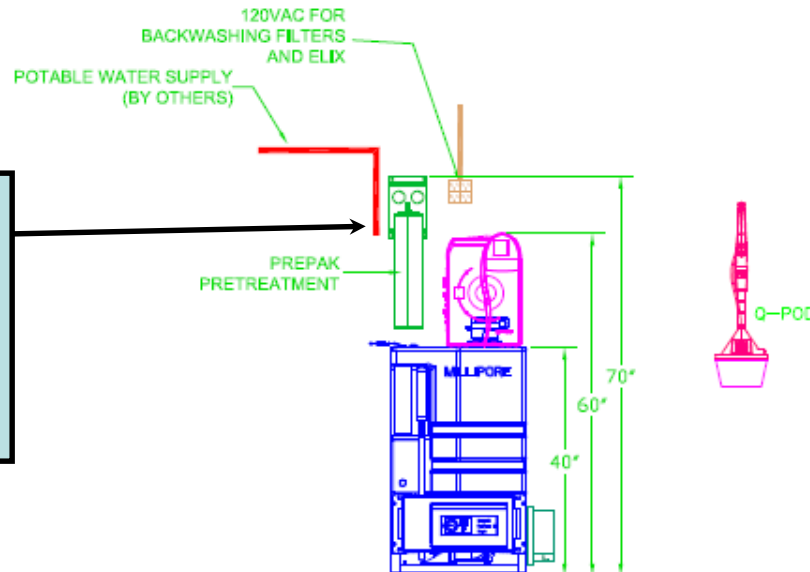
TAP WATER:
2 GPM AT 60 PSI

SHUT OFF VALVE WITH 1/2" NPTM

DRAIN:
5 GPM CAPACITY

ELECTICAL:
120VAC 20AMP SERVICE
WALL PANEL (OR APPROPRIATE
SUPPORT) FOR WALL MOUNTING
OF PRETREATMENT PACK AND Q-POD

NOTE: Q-POD LOCATION SHOWN AS TYPICAL.
Q-POD MUST BE LOCATED WITHIN 9 FEET
OF MILLI-Q INTEGRAL SYSTEM



Water Supply line must
be 1/2" NPTM (male)
cold water with shutoff
valve.

*Link to Email on
Sizing
Requirements*

Rep: Richard Goldstein

PRELIMIN
NOT FOR

Lab Systems:Water Types/Classifications

Overview of Lab Water Grades (from Millipore website 2/2/12)

Norms define different laboratory water grades for both technical and economical reasons. The purpose of these norms is to ensure that the right water quality is used for a specific application, while limiting laboratory operating costs – Type 1 water is more expensive to produce than Type 2 or Type 3 water.

Type 3 Type 3 water is the lowest laboratory water grade, recommended for glassware rinsing, heating baths and filling autoclaves, or to feed Type 1 lab water systems.

Type 2 Type 2 water is the grade used in general laboratory applications such as buffers, pH solutions and microbiological culture media preparation; as feed to Type 1 water systems, clinical analyzers, cell culture incubators and weatherometers; and for preparation of reagents for chemical analysis or synthesis.

Type 1 Type 1 water is the grade required for critical laboratory applications such as HPLC mobile phase preparation, blanks and sample dilution in GC, HPLC, AA, ICP-MS and other advanced analytical techniques; preparation of buffers and culture media for mammalian cell culture and IVF; production of reagents for molecular biology applications (DNA sequencing, PCR); and preparation of solutions for electrophoresis and blotting.

Using Type 1 water for Type 2 water applications is a common laboratory practice in order to decrease the risk of artifact generation during experimental procedures.

| Contaminant | Parameter and unit | Type 3 | Type 2 | Type 1 |
|--------------|----------------------------------|--------|--------|--------|
| Ions | Resistivity (MΩ•cm @ 25°C) | >0.05 | >1.0 | >18.0 |
| Organics | TOC (ppb) | <200 | <50 | <10 |
| Pyrogens | (Eu/ML) | NA | NA | <0.03 |
| Particulates | Particulates > 0.2 µm (units/mL) | NA | NA | <1 |
| Colloids | Silica (ppb) | <1000 | <100 | <10 |
| Bacteria | Bacteria (cfu/mL) | <1000 | <100 | <1 |

Lab Systems: Millipore Milli-Q, Maintenance Items and Schedule

Order Annually in July for September Install on Most Items

(note following data is from Feb 2011 Service Quote)

MQ Integral 15 (ZRXQ015T0) - F9EN98309B

| Catalogue Number | Description | Delivery Date | Qty | Unit Net Price (\$) | Total Net Price (\$) |
|------------------|--------------------------------------|----------------------|-----|---------------------|----------------------|
| 1. ZWMQINUE0 | Milli-Q Integral Service Essential | (v) 9/11 | 1 | 638.00 | 638.00 |
| 2. ZWMQINU10 | Milli-Q Integral additional PM visit | (v) 1/12, 5/12 | 2 | 456.00 | 912.00 |
| 3. ZWAAZONE1 | TRAVEL ZONE 1 | (v) 9/11, 1/12, 5/12 | 3 | 198.00 | 594.00 |
| 4. ZF3000423 | MAINTENANCE KIT INT | (s) 9/11 | 2 | 211.65 | 423.30 |
| 5. ZFA10UVM1 | A10 UV LAMP | (s) 9/11 | 1 | 461.55 | 461.55 |
| 6. ZLXUVLP01 | UV LAMP FOR ELIX UV | (s) 9/11 | 1 | 164.90 | 164.90 |
| 7. ZMQUVLP01 | UV LAMP FOR MQ CENTURY | (s) 9/11 | 1 | 354.45 | 354.45 |
| 8. MGP04001 | MILLIPAK EXPRESS 40 (1/PK) | (s) 9/11 | 1 | 128.35 | 128.35 |
| 9. TANKVNT02 | SDS TANK ELIX VENT FILTER | (s) 9/11 | 1 | 315.35 | 315.35 |
| 10. PRPK00001US | PREPAK 1 PRETREATMENT PACK 2/BOX W/O | (s) 2-9/11, 5/12 | 3 | 303.45 | 910.35 |
| 11. PR0G0T0S2US | PROGARD TS2 W/O | (s) 2-9/11, 5/12 | 3 | 292.40 | 877.20 |
| 12. QTUM0TEX1 | QUANTUM TEX CARTRIDGE (1/PK) | (s) 5/12 | 1 | 286.45 | 286.45 |
| | | | | Total (\$) | 6,065.90 |

Also need ZFRES00UV for lamps as well, per Kelly Dennehy at Millipore 6/22/12.

Lab Systems: Millipore Tubing, Connectors (John Guest), How-to



To Make a tubing connection:

1. Push yellow collar fitting into (flush with) the "T" fully
2. Insert tube into the collar while holding the collar against the T
3. Pull out on the tubing and the collar will move into a locked (as shown below) extended position securing the tube connection. There are small barbs inside that lock the tube to the collar while in the "out" position.



To Remove tubing from a "T" or other fitting tubing connection

1. Push yellow collar fitting into (flush with) the "T" fully
2. Pull out on the tubing while holding the collar against the fitting

Tee, Union, Pk10

Item # 4HN16

Union Tee, Push In, Tube Connection,

Tube Outside Dia 1/4 In,

Material of Construction Acetal Copolymer,

Max Pressure 150 PSI, Max Torque 1.5Nm

JOHN GUEST

PI-0208-S \$39.75

Union Tee, Tube OD 1/4 In, Poly, PK 10

Item # 1WTK8

Union Tee, Push In, Tube Outside Dia 1/4 In, Tube Connection,

Material of Construction Polypropylene, Max Pressure 150 PSI,

Temp Range 9 To 150 Deg F

JOHN GUEST

PP0208W-PK10

Lab Systems: Water, Millipore, Spare Parts

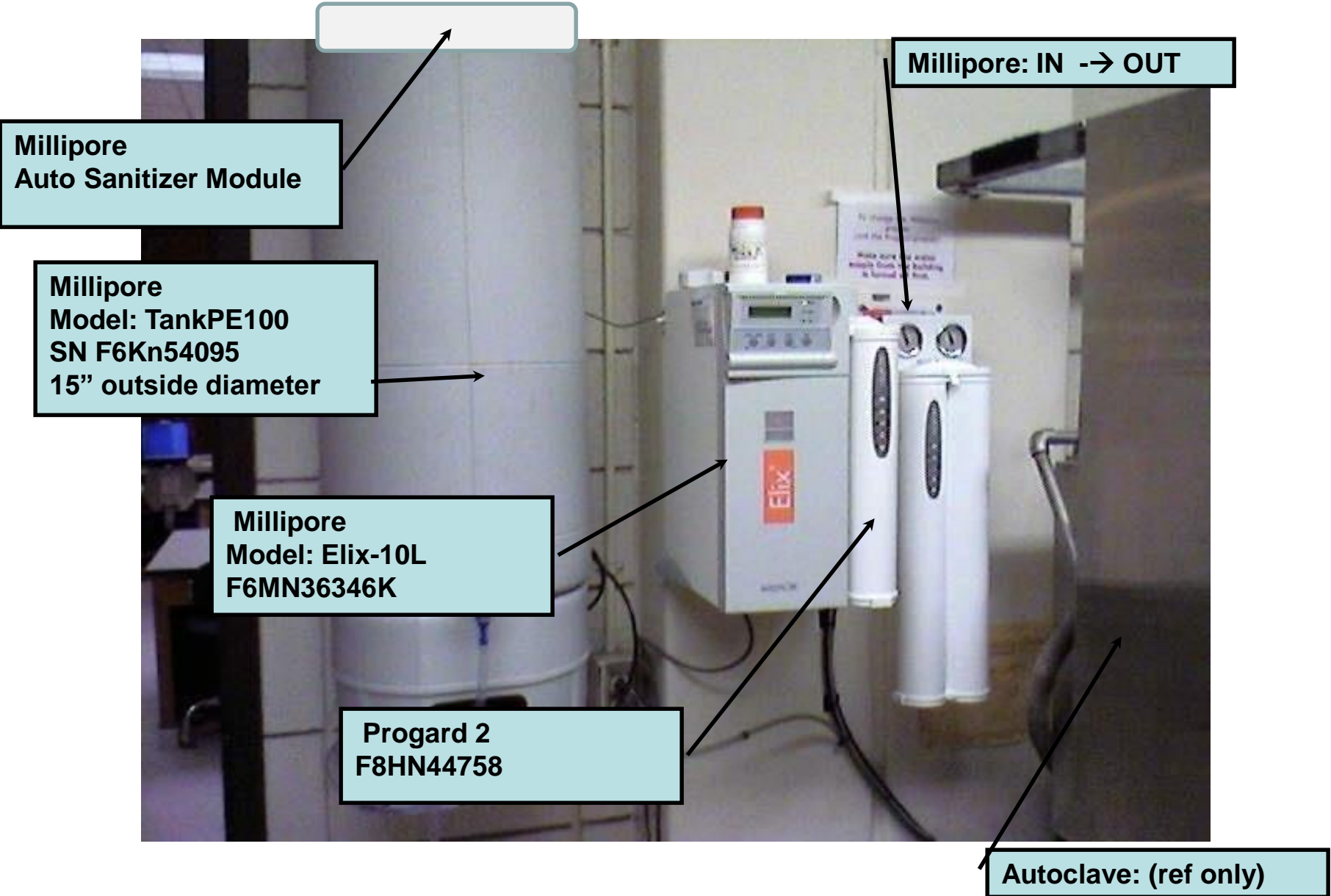


Shurflo Water boost pump systems

Model: 84-522-02/SN 72-7685

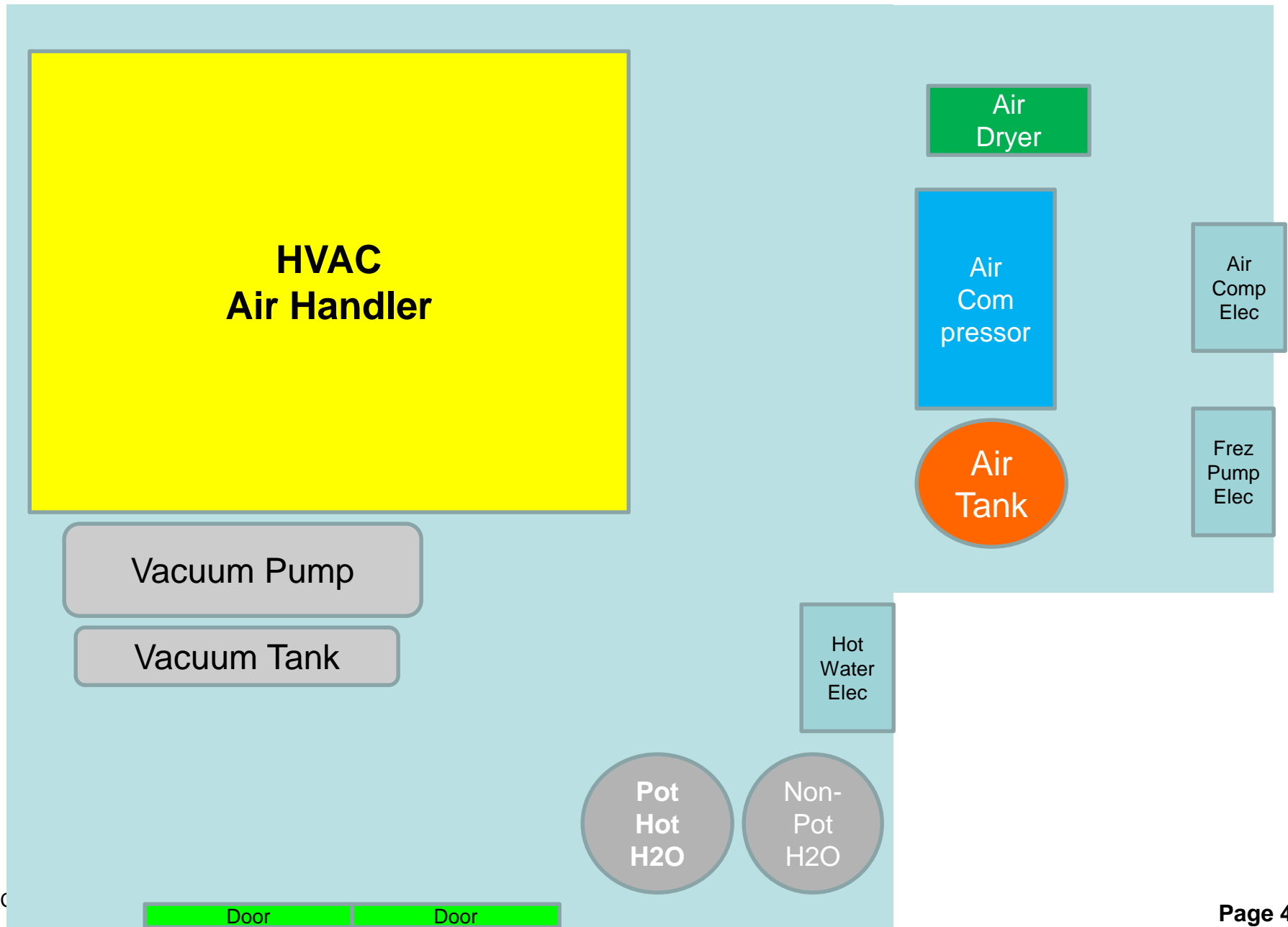
Model: 8025-933-236

Lab Systems: FV Millipore Systems



Lab Systems: BRDG, Mechanical Room 111 Layout

(See following slides for Pictures and Details)



BRDG Park: Operations, Key Contacts

- **HVAC**

- FV HVAC, Gary Roney (supervisor) 314-513-4359, Cell 314-565-1366, Fax x 4098
- FV HVAC, Mark Tornetto (engineer) 314-513-4363 , Fax x 4825
- **HVAC Controls: ATECH Industrial Electronics, 429 Sovereign Ct, STL 63011, 314-584-1162** (*cold air R124 issues Jan2014*)
 - **Technician: Robert Montgomery or David, 314-574-1162 (Jan2014)**
 - **IP in panel box R111: 99.25.65.105** , 255.255.255.0
- Manf: JCI: Johnson Controls Inc, 2280 Ball Drive, STL 63146, 314-812-4502

- **Fans**

- Manf: Greenheck
- Rep: H.C. Sharp, 8301 Crest Industrial, STL 63123, 314-351-6900

- **Air Compressor/Vacuum Pump**

- Manf: Kobelco
- Rep: HTE Technologies, 2021 Congressional Dr, STL, 314-731-4444

- **Phoenix Valves**

- Manf: Phoenix
- Rep: Friemel Love, 7704 Big Bend, STL, 314-647-6363

Lab Systems: BRDG, Mechanical R111, Air Treatment/Dryer



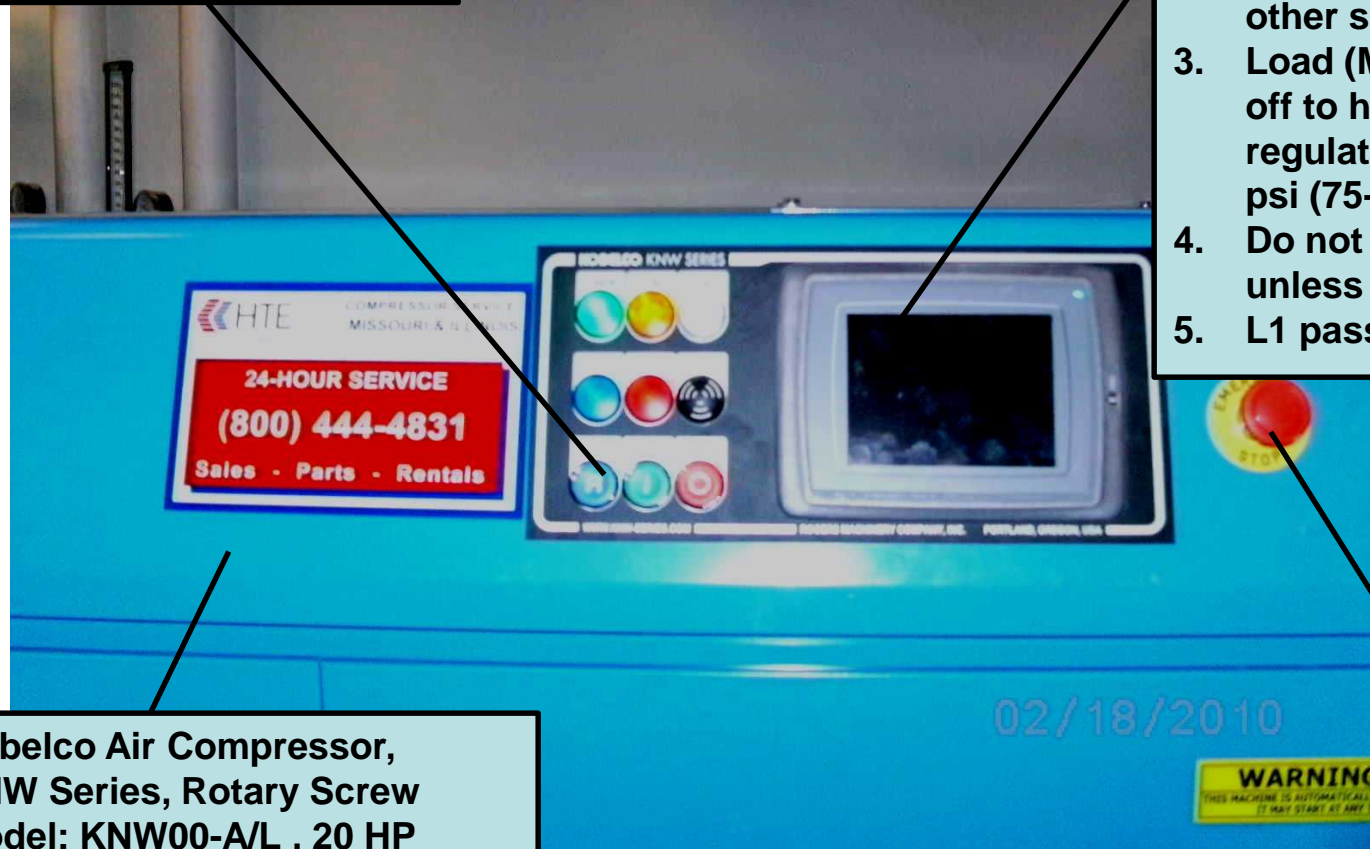
Lab Systems: BRDG, R111, Air Compressor Control Panel, Master ON/OFF Controls

Master on/off

Turn ON: press Green "I"
Turn OFF: press Red "O"

Touch Screen Display

1. Follow arrows to next screen
2. Tap main screen center to see other screen options ex; Alarms
3. Load (Manual off/on), leave Man off to have compressor self-regulate pressure in tank at 90 psi (75-100 range set Oct 2012)
4. Do not change any parameters unless you are qualified!
5. L1 password=1844, L2=6151



Kobelco Air Compressor,
KNW Series, Rotary Screw
Model: KNW00-A/L , 20 HP
SN: 09J6111886
Service: HTE Compressed Air
Solutions , 800-444-4831
HTE Emergency: 314-726-9823

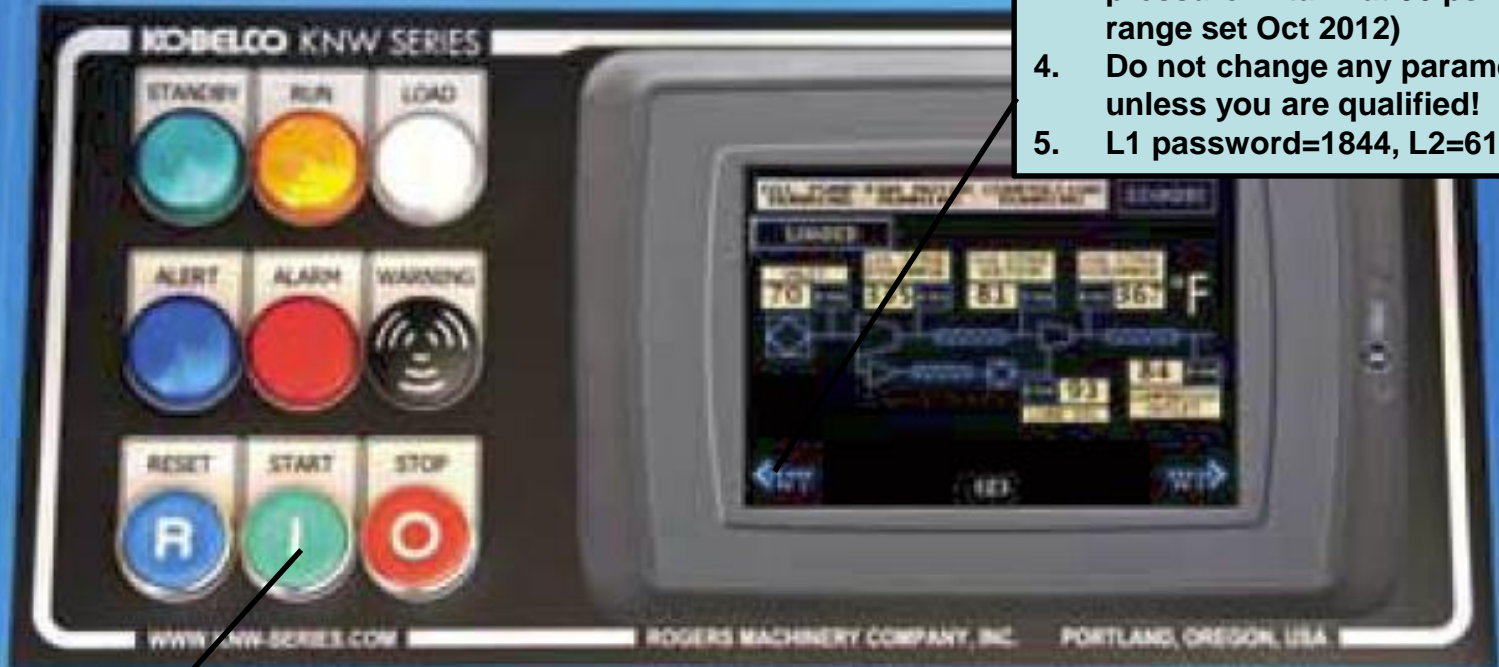
**EMERGENCY OFF
ONLY**

Hotlink to Operations Manual...pdf 56 pgs

Lab Systems: Compressor Control Panel

Touch Screen Display

1. Follow arrows to next screen
2. Tap main screen center to see other screen options ex; Alarms
3. Load (Manual off/on), leave Man off to have compressor self-regulate pressure in tank at 90 psi (75-100 range set Oct 2012)
4. Do not change any parameters unless you are qualified!
5. L1 password=1844, L2=6151



Master on/off

Turn ON: press Green "I"
Turn OFF: press Red "O"

Lab Systems: BRDG, Mechanical R111, Air Compressor

Rear of Cabinet: Clean Every 3mo
Air Intake Grill and Filter and
Cooling Air intake on other side

Pressure Reading STLCC
(topmost); 75-125 psi After
10/2/12 setting change

Pressure Reading Akermine
line (lower); 75-125 psi

Kobelco Air Compressor,
KNW Series, Rotary Screw
Model: KNW00-A/L , 20 HP
SN: 09J6111886
Service: HTE Compressed Air
Solutions , 800-444-4831

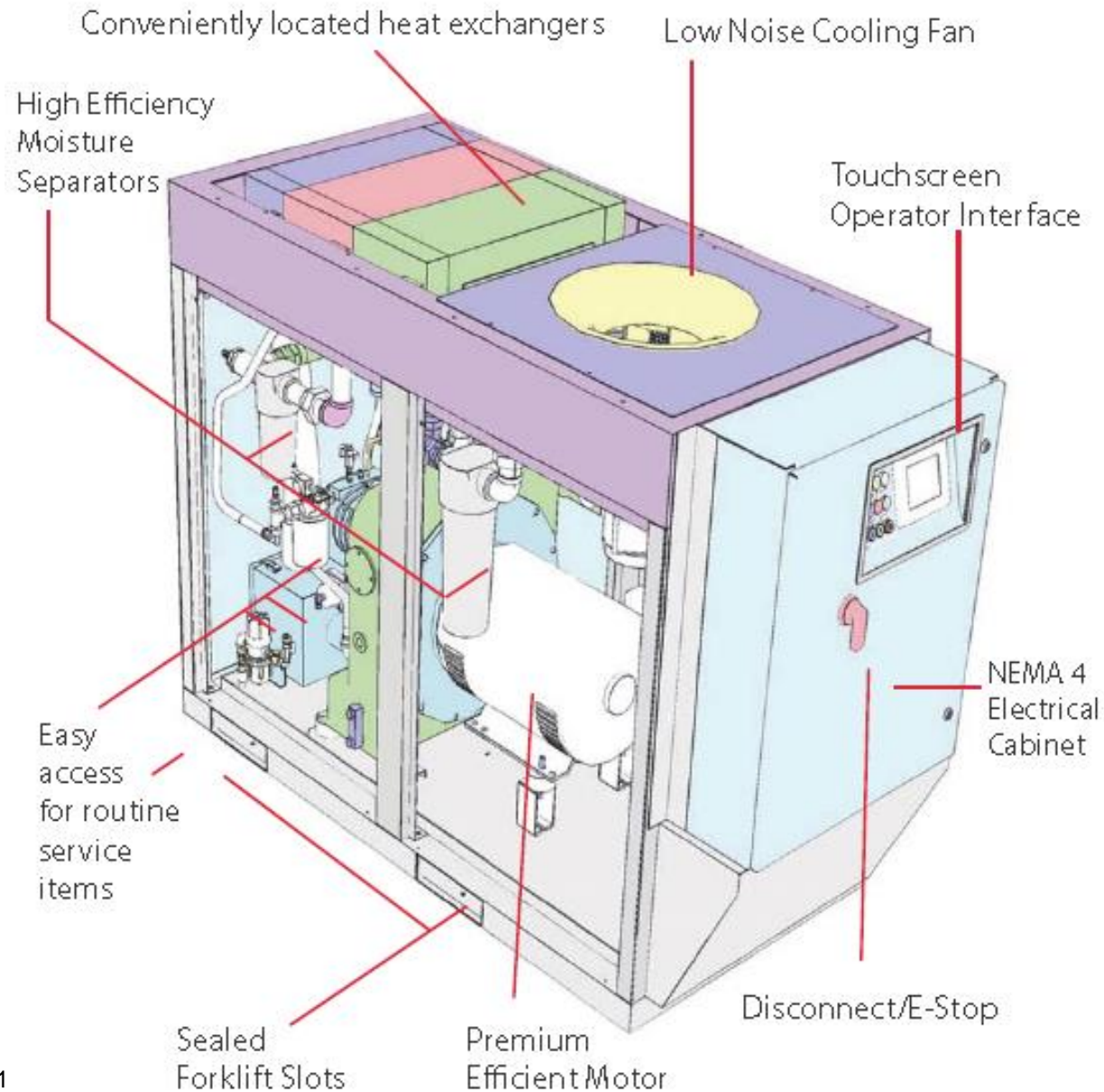
For Service either call or
email Chris at:
Chris.jones@htetech.com
Emergency: 314-726-9823
Mark (service tech) at cell
636-212-0402.

Front Panels can be removed (pull
back at top) to view internal
components and check Oil Level
gauge (clear tube located on
bottom). Oil level should be in
middle of red lines.

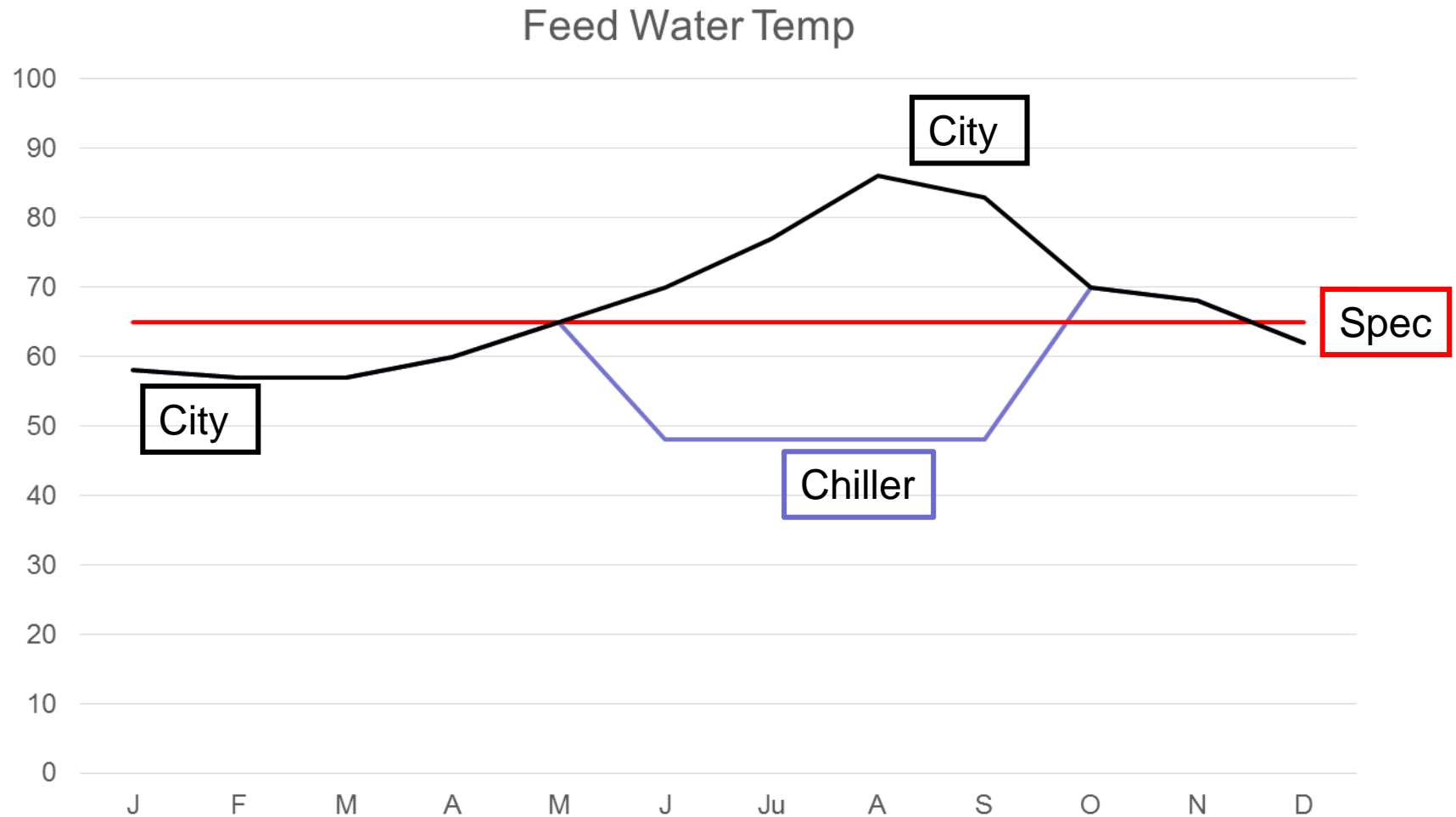
After adjusting pressure
range settings with H T E
Oct 2012, observations
indicate that it takes about
14 minutes to drop from max 125
to 75 when load cycle resumes
or about .1 psi loss every two seconds

02/18/2010

Lab Systems: Compressor, Kobelco, 20HP, Rotary Screw Design Features

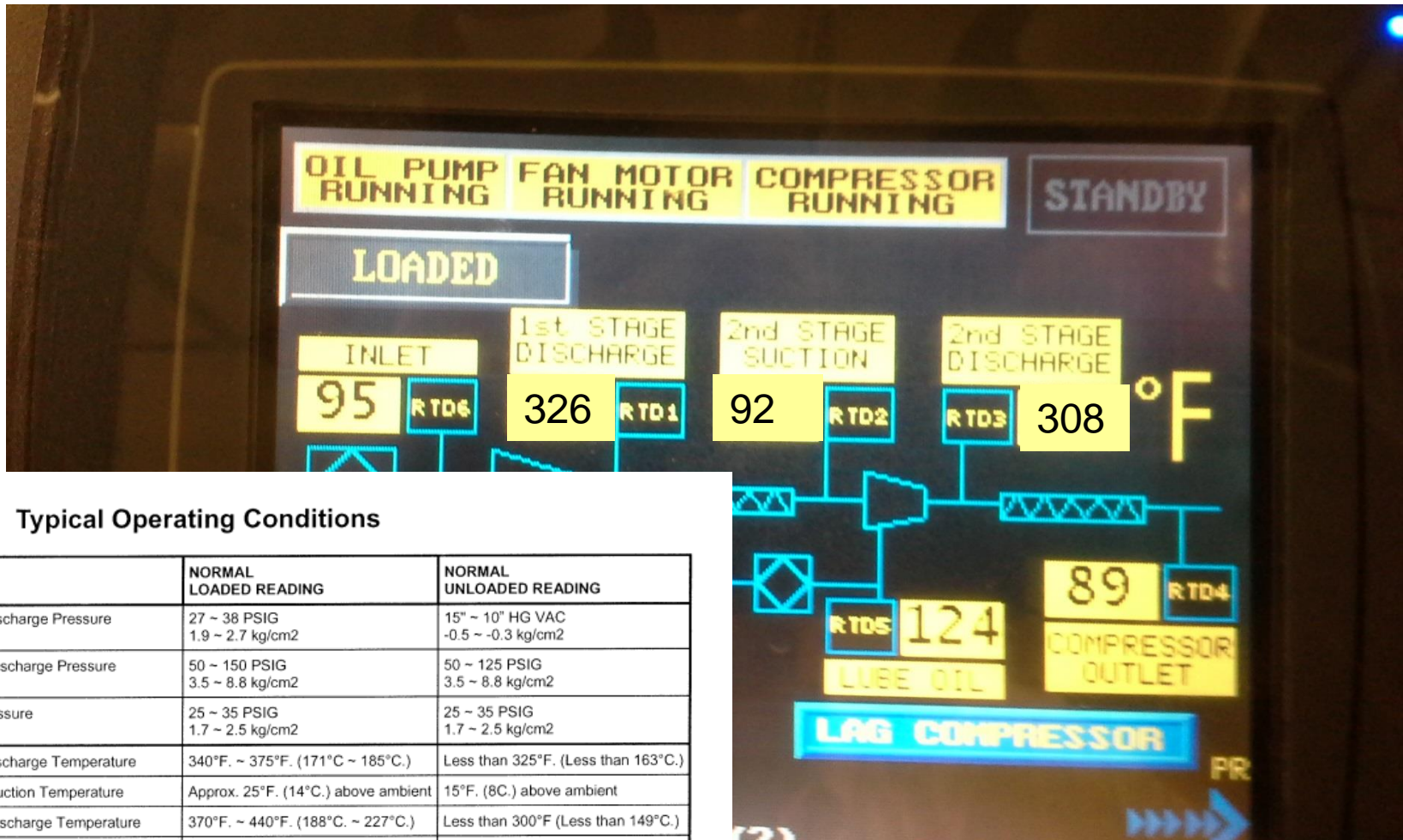


Lab Systems: Compressor Cooling Water



Lab Systems: Compressor Internal Temps, Loaded 9/10/15 HTE data, City Feed water 82F, Outlet 90F

Alarm Set Points: 504 150 504



HTE Compressor Service2021 Congressional Dr., St. Louis, MO 63146
2415 N. 22nd St., Decatur, IL 62526

DATE

2015-09-10

WORK ORDER #

696169

TM

PAGE #

(800) 444-4831 • (314) 731-4424 fax

| | | | | | |
|---------------|-------------------------------------|--------|----------|------|---------|
| CONTACT | Richard Norris | ACCT # | C1320-00 | TECH | SALES |
| EMAIL | bmorrison@stlcc.edu | P.O. # | | PM | Unknown |
| PHONE # | 314-513-4951 | | | | |
| COMPANY | St. Louis Community College C P L S | | | | |
| ADDRESS | 1005 N Watson Rd, Rm 122 | | | | |
| City, St, Zip | Olivette, MO 63132-0000 | | | | |

For concerns about any service issues please contact:

Service Manager ext 136
Performance Satisfaction Manager ext 49
Service Coordinator ext 127
Parts Coordinator ext 124
Walter Deeken
Tina Maye
Jeff Nichols
Rose Samnee

| | | | | | |
|----------------------|-------------|------------|-----------|------------|---------------|
| DIRECTIONS | PLANT RULES | ARRIVAL | DEPARTURE | TOTAL TIME | JOB STATUS |
| | | 12:30 | 1:45 | 1:15 | COMPLETE |
| MODEL: KNW00-A/L | | ECB REF #: | | | FNS: |
| SERIAL #: 09J6111886 | | PURPOSE: | See notes | | |
| SERVICE CALL: | | RUN HRS: | | LOAD HRS: | # MTS STARTS: |

CAUSE:

CORRECTIVE ACTION:

ADDITIONAL PARTS

| | | | |
|------|---------|-----------------------------------|--------------------|
| QTY | PART | DESCRIPTION | UNIT \$ |
| 0.40 | TRAVEL | TRAVEL PER HOUR PER TECH | \$125.00 |
| 10 | MILEAGE | MILEAGE | \$1.25 |
| | LABOR | LABOR PER HOUR (OIL FREE = \$135) | \$125.00 |
| | OVERT | TRAVEL PER HOUR PER TECH | TRAVEL \$1.50/HOUR |
| | PER DI | AGENCIES - 4 HOUR MINIMUM | LABOR \$1.50/HOUR |
| | WASTE | EXPENSES | \$185.00 |
| 1 | SAFETY | DISPOSAL FEE | \$3.50/GAL |
| | | (MIN \$15 / MAX \$250) | 6% |

ADDITIONAL SERVICE NOTES:

Customer is having a problem with the compressor shutting down when they switch to the county water supply. The county water supply temp. is in the 90s. It should not shut off until it hits 90. Check out temp & water flow. It should flow 80 gallons per minute at least.

LAST APPT: 2015-05-12 684522 JSV No oil pressure

ACCEPTANCE NAME: DATE: 9/10/15

PARTS USED: COMPLETE

SUB-TOTAL - TRAVEL, MILES, LABOR

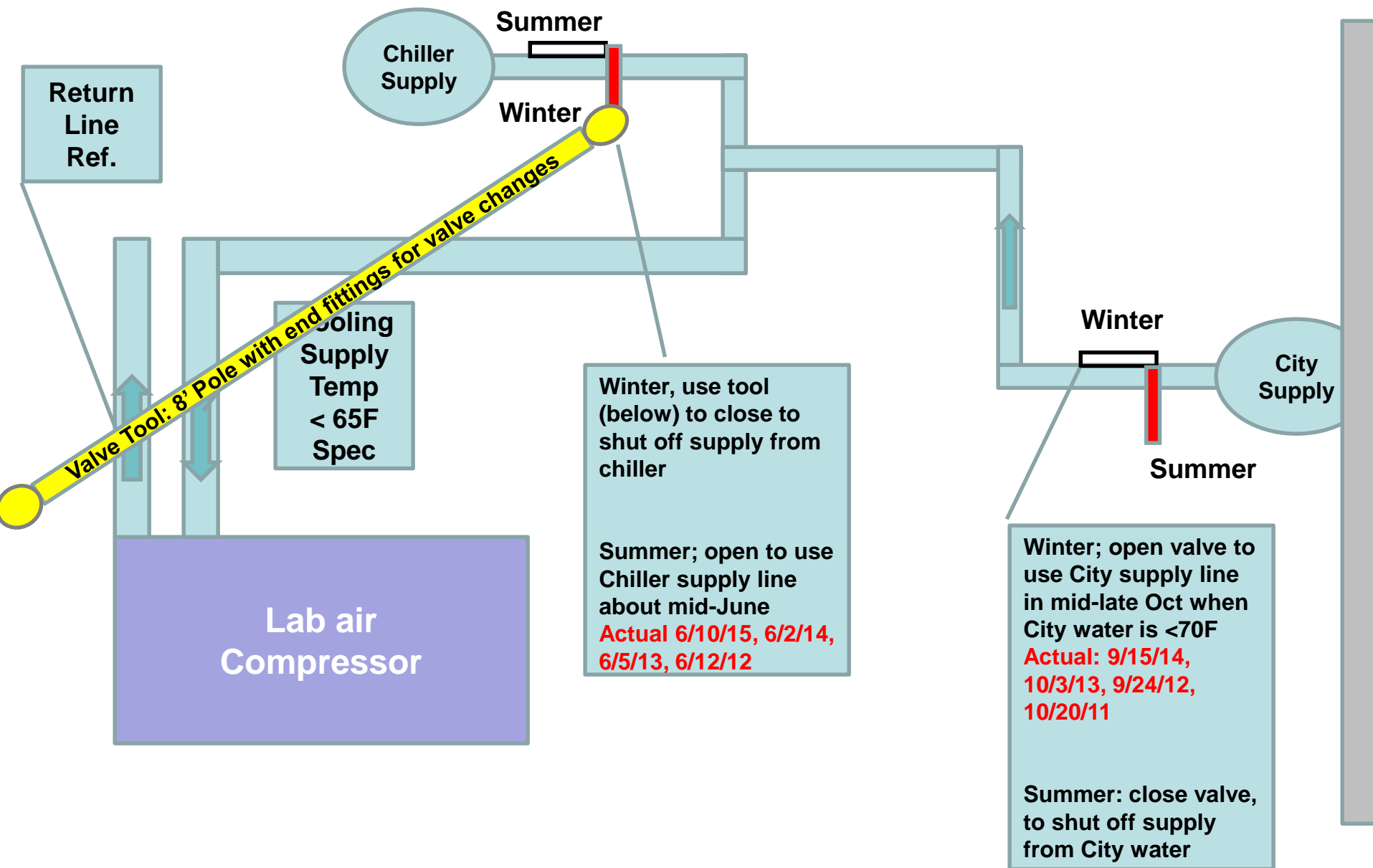
TOTAL

I hereby agree to HTE Technologies' Terms & Conditions

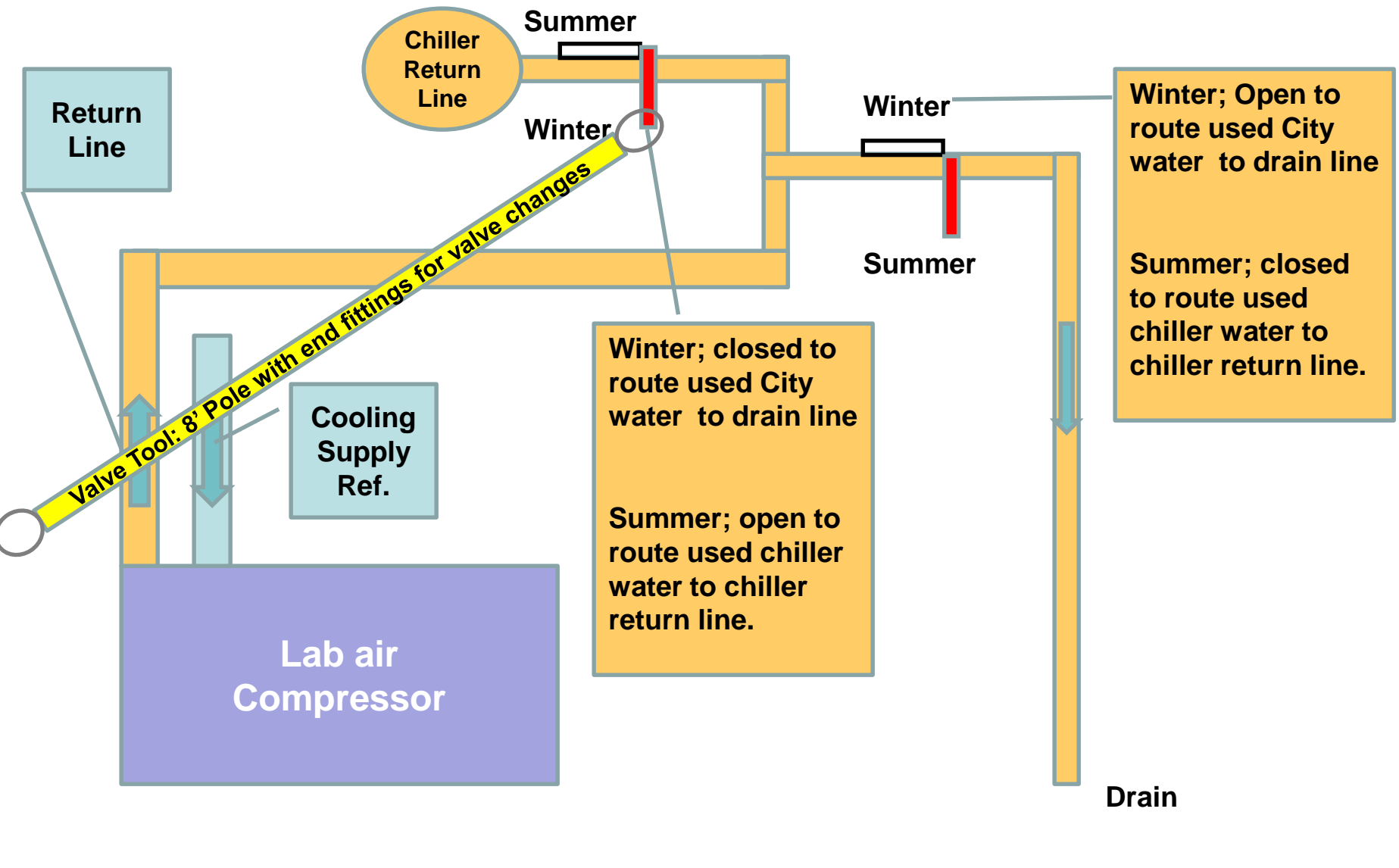
DO NOT WRITE IN THESE SPACES

COMPLETION - PARTS & SUPPLIES

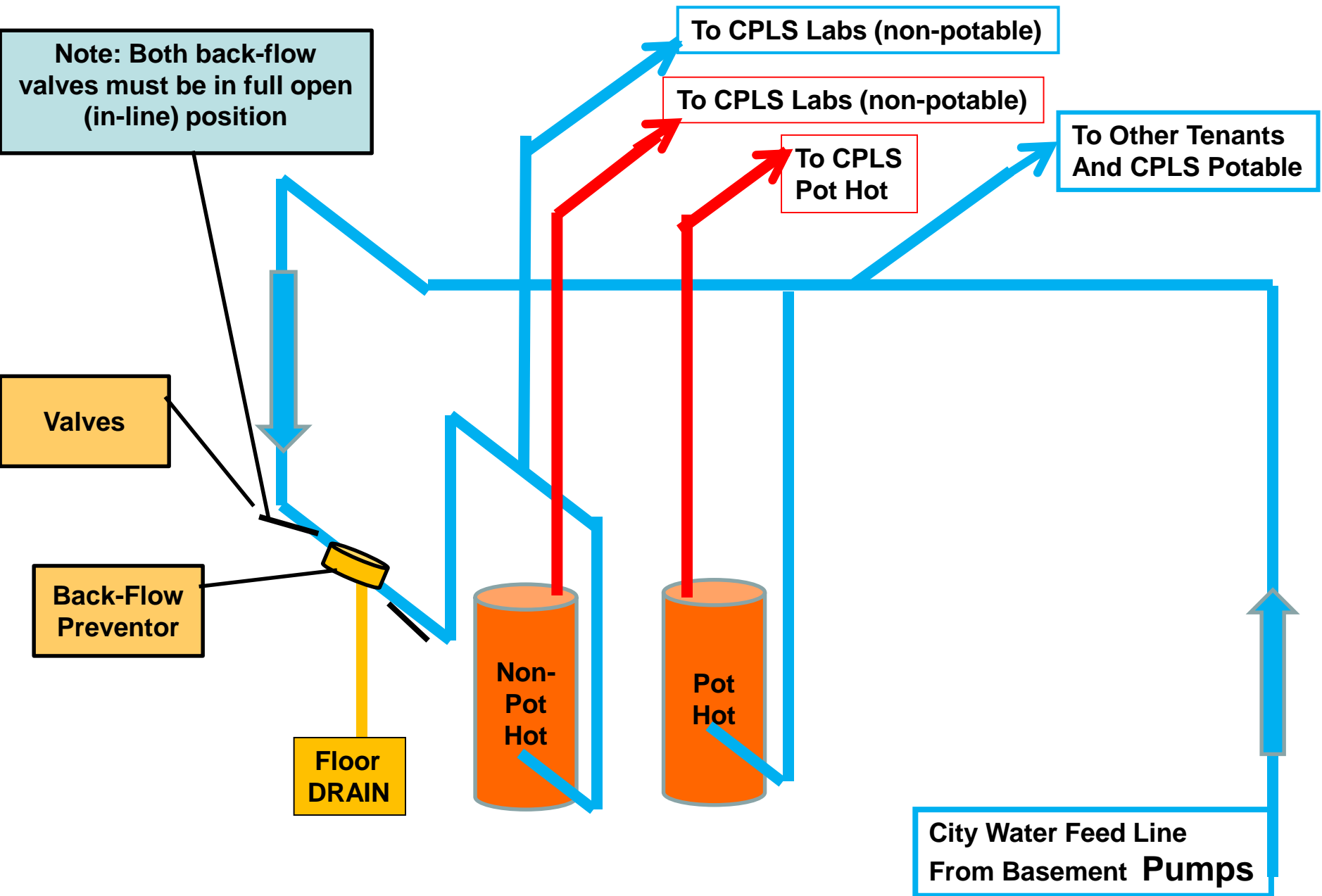
Lab Systems: Air, Compressor, Cooling Water Supply Lines



Lab Systems: Air, Compressor, Cooling Water Return Valves



Lab Systems: Cold and Hot Water Feed Lines, R111



Lab Systems: Mechanical, Compressor/Vacuum Requirements from Planning Documents/Dwgs

Pressure Reading STLCC
(topmost guage)
75-120 nominal

AIR COMPRESSOR SYSTEM (CC-AC-1):

- A. AIR COMPRESSOR SYSTEM SHALL CONSIST OF AN AIR COMPRESSOR, PARTICULATE FILTER 1, REFRIGERATED AIR DRYER, RECEIVER TANK, AND PARTICULATE FILTER 2. THE SYSTEM SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATIONS AS SHOWN ON THE COMPRESSED AIR RISER.
- B. COMPRESSOR SHALL BE CAPABLE OF PRODUCING 73 ACFM AT 100 PSIG, TWO-STAGE, WATER COOLED WITH 5 GPM OF CHILLED WATER AT 65°F, OIL-FREE, ROTARY SCREW, 460V/3 ϕ /60HZ, AND 40 HP. BASIS OF DESIGN: KOBELCO KNWOO-A/L.
- C. PARTICULATE FILTER 1 AND 2 SHALL BE CAPABLE OF FILTERING 3 MICRON PARTICULATE AT 75 SCFM. BASIS OF DESIGN: ZEKS 75PT.
- D. REFRIGERATED AIR DRYER SHALL BE CAPABLE OF 75 SCFM AT 38°F PRESSURE DEW POINT, 1.5 PSI PRESSURE DROP, 208V/3 ϕ /60HZ, AND AIR COOLED. BASIS OF DESIGN: ZEKS 75HSG.
- E. RECEIVER TANK SHALL BE CAPABLE OF A 200 GALLON CAPACITY, 30" ϕ , AND A 200 PSIG WORKING PRESSURE. BASIS OF DESIGN: SILVAN INDUSTRIES 92-30-200-200.

VACUUM PUMP SYSTEMS (CC-VP-1):

- A. 134 CFM, 5 HP-DUPLEX UNIT, RIETSCHLE THOMAS MODEL # VXTD-100, 120 GALLON RECEIVER, 29.5" OF MERCURY ABSOLUTE, 480V/3 ϕ /60 HZ, DUPLEX CONTROL CENTER SHALL CONSIST OF:
 - a. (1) MAGNETIC STARTERS
 - b. (1) HOUR METERS
 - c. (1) LOW VOLTAGE CONTROL TRANSFORMER WITH PRIMARY & SECONDARY FUSES
 - d. (1) MANUAL-OFF-AUTO SELECTOR SWITCHES
 - e. AUTOMATIC ALTERNATOR HOUSE IN A NEMA 1 ENCLOSURE
 - f. DISCONNECT SWITCH

Pressure Reading STLCC
28.2 10/12/12 RGM

Lab Systems: Vacuum, Elmo Rietschle Specs

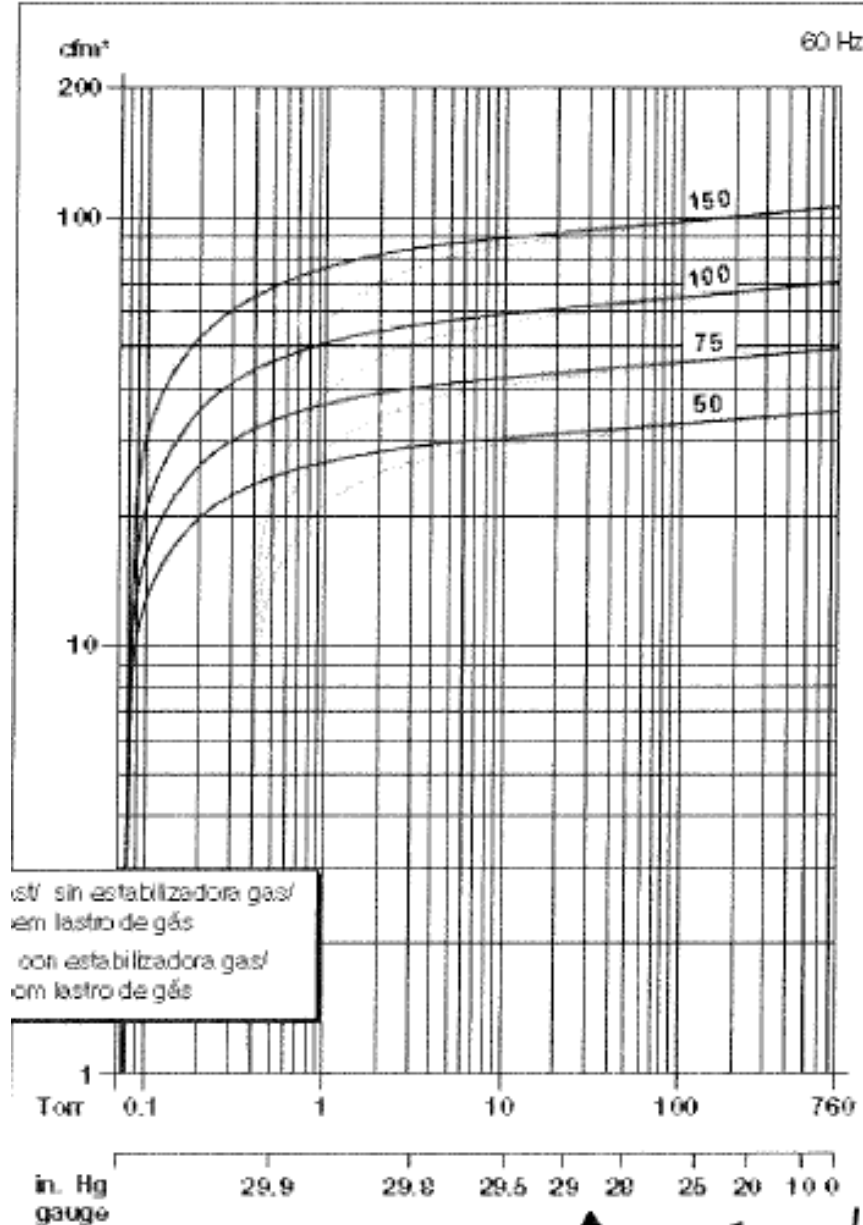
ELMO
RIETSCHLE

GARDNER DENVER HANOVER INC.
VXTD-100-122F

↓ BRDG
STLCC

| VC | | 50 | 75 | 100 | 150 |
|---------|---------------------------------------|-----------------------------------|-------------|------------------|-------------|
| cfm | 50 Hz | 29.4 | 41.2 | 58.9 | 88.3 |
| | 60 Hz | 35.3 | 49.4 | 70.6 | 106 |
| P | | 0.075 Torr - 29.92 in. Hg (gauge) | | | |
| 3~ | 50 Hz | 230/400V ± 10% | | | |
| | 60 Hz | 208-230/400V ± 10% | | | |
| kw | 50 Hz | 1.25 | 1.85 | 2.2 | 3.0 |
| hp | 60 Hz | 2.0 | 3.0 | 5.0 | 5.0 |
| A | 50 Hz | 8.8/5.1 | 9.6/5.83 | 8.3/4.8 | 14.4/6.6 |
| | 60 Hz | 6.5-6.2/3.1 | 8.5-8.2/4.1 | 15-13.2/6.6 | 15-13.2/6.6 |
| rpm | 50 Hz | 1450 | | | |
| | 60 Hz | 1740 | | | |
| dB(A) | 50 Hz | 64 | 64 | 66 | 68 |
| | 60 Hz | 67 | 68 | 69 | 71 |
| lbs | 50 Hz | 126 | 130 | 194 | 196 |
| | 60 Hz | 138 | 155 | 207 | 207 |
| qt | | 3 | 3 | 4 | 4 |
| ZFP | | 145 (06) | 145 (03) | 216 (06) 32 (54) | 216 (06) |
| ZVF | | 32 (53) | 32 (53) | | 40 (53) |
| ZMS | | # | # | # | # |
| cfm | Nominal capacity | | | | |
| P | Ultimate partial vacuum | | | | |
| | Measured with LN ₂ trapped | | | | |
| | McLeod gauge | | | | |
| 3~ | Motor version | | | | |
| kw / hp | Motor rating | | | | |
| A | Full load amperage | | | | |
| rpm | Speed | | | | |
| dB(A) | Average noise level | | | | |
| lbs | Weight | | | | |
| qt | Approximate oil capacity | | | | |
| | Accessories | | | | |
| ZFP | Vacuum tight dust separator | | | | |
| ZVF | Vacuum tight suction filter | | | | |
| ZMS | Motor starter | | | | |

Lab Systems: Vacuum, VXTD-100, In Hg., CFM



ist/ sin estabilizadora gas/
em lastro de gás
com estabilizadora gas/
com lastro de gás

ist/ à l'état régulier à l'aspiration./ refere-se a condições de entrada da bomba.
ing temperatura./ Las curvas y las tablas se han elaborado conforme las normas PNEUROP
aux sont établies selon la norme PNEUROP, pompe à température de fonctionnement./ As
peratura normal de operação.

Reading
BubM

Lab Systems: Mechanical, Compressor/Vacuum Requirements from Planning Documents/Dwgs

Pressure Reading STLCC
(topmost guage)
75-125 nominal

AIR COMPRESSOR SYSTEM (CC-AC-1):

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 - d. (1) MANUAL-OFF-AUTO SELECTOR SWITCHES
 - e. AUTOMATIC ALTERNATOR HOUSE IN A NEMA 1 ENCLOSURE
 - f. DISCONNECT SWITCH

Pressure Reading STLCC
28.2 10/12/12 RGM

Lab Systems: Service Calls, Compressor, 9/29/10

From: Morrison, Robert G.
Sent: Wednesday, September 29, 2010 8:01 AM
To: 'chris.jones@htetech.com'
Subject: St. Louis Community College at BRDG Park

Chris,

We spoke a few moments ago about our need for a service call on a large Kobelco Compressor at our site, model # KNW00-A/L, SN 09J6111886. This compressor supplies air pressure to four lab and classrooms at our location. We are getting alarm conditions with a message pertaining to High Oil Temperature and Inlet Air temperature exceeding nominal conditions. Your company name and number are affixed to this device as well as another vacuum pressure system at our facility. We are part of St. Louis Community College system officially known as the Center for Plant and Life Sciences (CPLS). Our building and billing address is CPLS, BRDG Park, 1005N. Warson Rd, Creve Coeur 63132. All billings should be directed to Dr. Richard Norris, the director of this facility. My name is Bob Morrison and my title is "Instrumentation Specialist". I am in charge of documenting and maintaining operations of all of the equipment and scientific instrumentation at this facility. The compressor in question is located in R111 of the building and as is locked under normal conditions. Keys for the room can be obtained from me or other faculty or Angela Taylor the administrator for Richard Norris. My cell number is 314-971-3795 and I can be reached at this number between 6am and 10pm any day of the week. If possible, we'd like the service call to be made between 7am and 1pm on any workday, however I can meet you at other times if necessary. The unit in question has never been serviced to our knowledge as was put online in operation in June 2009.

Let me know if you need any more information.

Lab Systems: Service Calls; Compressor 10/6/10

The service person from HTE Technologies who I called to check on the recent R111 compressor alarms came here about 1pm on Wed. He (Mark) did not find anything conclusive to determine the cause of the problem and left after 2+hours of investigation which included calls to his main office and the manufacturer for assistance. Today I called his main office and spoke at length with him and his supervisor which again reached no conclusions. Their advice at this point is to wait until it occurs again and then call Mark directly on his cell and he will try to respond “during” the alarm condition.

Mark’s cell # is 636-212-0402. So, If I’m not here or reachable, perhaps Angela or someone could call him. I’m leaving the door to R111 with the door lock blocked so a key is not required to get inside in case he comes after hours. The key is stored in our faculty office if needed.

[Hotlink to Service Call Work Order/response sheet.....pdf](#)

Company St. Louis Clean City P.O.# _____ Date 6/28/12 W/O SSYK02
Contact _____ Ph # _____ Model YNW00 A/L S/N 59 TLH856
Fluid Turbo 68 Hours 5569 Loaded _____ Voltage _____ Amps _____
Dryer Model _____ S/N _____ Refrigerant/Desiccant _____
AdvantagePM ☐ PROTech ☐ MASTERTech ☐ eXPERTech Tech's Initials _____

SERVICED QUARTERLY MAINTENANCE (complete all items from INSPECTION CHECKLIST)

Page 2 of 2

- YES NO 33. Replace air inlet filter element as indicated by gauge reading, or at 1 year interval, whichever comes first
YES NO 34. Replace oil filter element as indicated by gauge reading, or at 1000 hour interval, whichever comes first
YES NO 35. Replace non-synthetic lubricants per manufacturer's guidelines or add lubricant as needed
YES NO 36. Inspect & clean return line strainers and orifices
YES NO 37. Clean control regulator blender orifice
YES NO 38. Clean spiral valve regulator bleeder orifice (if applicable)
YES NO 39. Remove and clean control line filter, or replace element
YES NO 40. Clean water traps and replace as needed

SERVICED DRYER MAINTENANCE

- YES NO 1. Clean condensate drain valve
YES NO 2. Clean coil

Notes: Explain any item not serviced

SERVICED ANNUAL MAINTENANCE (complete all items from QUARTERLY SERVICE CHECKLIST)

- YES NO 41. Replace separator(s) as indicated by gauge reading, or at 1 year interval, whichever comes first
YES NO 42. Replace synthetic lubricants every 1000 hours, or once a year, whichever comes first
YES NO 43. Replace MPV "O"-ring & spring, or install rebuild kit as needed check Valve
YES NO 44. Rebuild control regulator(s)
YES NO 45. Pressurize spiral valve to check for leaks (if applicable)
YES NO 46. Rebuild poppet style inlet valve (bi-annually for sulicon style)
YES NO 47. Rebuild oil stop valve (barrel-style valve only)
YES NO 48. Clean or rebuild blow down valve as needed
YES NO 49. Replace belts as needed
YES NO 50. Grease motor bearings (customer to provide grease)

SERVICED DRYER MAINTENANCE

- YES NO 1. Clean condensate drain valve
YES NO 2. Clean coil
YES NO 3. Change/clean control line filter
YES NO 4. Change particulate filter element
YES NO 5. Change coalescing filter element
YES NO 6. Clean or replace filter housing drains

Notes: Explain any item not serviced

314-726-9823

☐ Accept Recommended Services Signature _____ Use Same PO# or New PO# _____
☐ Decline Recommended Services Signature _____ Start-up Instruction Service Requirements _____
initials

**Lab Systems: Compressor,
Service History
28 June 2012 pg 1/2;
Alarms/alerts in recent
weeks "High Inlet Air
Temp" which was false,
temp <80F.**

| CONTACT | Bob Morrison | ACCT # | C1320 | CREDIT | | TECH | | IMP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|------------------------------|--|--------------|-------------|-------|--|-----|------------------|--|--|--|--------------|--|-----|--------|-------------|------|-------|-------------|---|------------|--------|----|--|------|---|---------|---------------------|--|--|------|---|-----------|-----|-----|--|-----|----|--------|--------------------------|--|---------|------|----|---------|---------|--|--------|------|--|-------|----------------|--|---------|-----|--|-----------------|-----------------------------|----------------------|--|--|--|----------------|------------------------------|---------------------|--|--|--|------------------|----------|--|----------|--|---|--|--|--|-------|--|----------------------------|--|--|--|--|--|----------------------------------|--|--|--|--|--|-------|--|--|--|--|--|
| PHONE # | 314-971-3795 | P.O. # | | | | SALES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| COMPANY | St. Louis Community College C P L S | HTE SERVICE CONTACTS | for concerns about any service issues please contact: Service Coordinator - Chris Jones ext. 1127 Service Assistant - Shannon Gnau ext. 1102 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ADDRESS | 1005 N Warson Rd | | for other service issues please contact: Parts Suzanne Tuck ext. 1124 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CITY, ST, ZIP | Olivette, MO 63132 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DIRECTIONS | | ARRIVAL | DEPARTURE | TOTAL TIME | JOB STATUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1015 | 320 | | COMPLETE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MODEL: KNW00-A/L | | PURPOSE: | APM- High Inlet Alarm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SERIAL #: 09J6111886 | | PM STATUS: | Unknown Unknown | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SERVICE NOTES: | 2010-10-14 531034 MP In Inlet Temp 2 2010-10-06 530238 MP High Oil Temp and Inlet Temp For Alarm / switch RTD 6 and 2 - May Require New Probe Run - Impact Tim: change: oil / oil filter / oil sample • Discharge Valve Rebuild: Inlet Valve / 3 way solenoid | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th colspan="4">ADDITIONAL PARTS</th> <th colspan="2">ACTION ITEMS</th> </tr> <tr> <th>QTY</th> <th>PART #</th> <th>DESCRIPTION</th> <th>UNIT</th> <th>TOTAL</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>501035-067</td> <td>Sample</td> <td>SS</td> <td></td> <td>INFO</td> </tr> <tr> <td>1</td> <td>KST00..</td> <td>Pressure Transducer</td> <td></td> <td></td> <td>PART</td> </tr> <tr> <td>1</td> <td>120-80-05</td> <td>oil</td> <td>oil</td> <td></td> <td>SVC</td> </tr> <tr> <td>40</td> <td>TRAVEL</td> <td>TRAVEL PER HOUR PER TECH</td> <td></td> <td>\$99.00</td> <td>INFO</td> </tr> <tr> <td>10</td> <td>MILEAGE</td> <td>MILEAGE</td> <td></td> <td>\$1.50</td> <td>PART</td> </tr> <tr> <td></td> <td>LABOR</td> <td>LABOR PER HOUR</td> <td></td> <td>\$99.00</td> <td>SVC</td> </tr> <tr> <td></td> <td>OVERTIME TRAVEL</td> <td>OT TRAVEL PER HOUR PER TECH</td> <td>Travel x1.5 OT x2</td> <td></td> <td></td> </tr> <tr> <td></td> <td>OVERTIME LABOR</td> <td>EMERGENCIES - 4 HOUR MINIMUM</td> <td>LABOR x1.5 OT x2</td> <td></td> <td></td> </tr> <tr> <td></td> <td>PER DIEM - OTHER</td> <td>EXPENSES</td> <td></td> <td>\$175.00</td> <td></td> </tr> <tr> <td>1</td> <td colspan="3">SUPPLIES & SAFETY/ENVIRONMENTAL (Min \$15 / Max \$225)</td> <td>75.00</td> <td></td> </tr> <tr> <td colspan="4">SUB-TOTAL PARTS & SUPPLIES</td> <td></td> <td></td> </tr> <tr> <td colspan="4">SUB-TOTAL - TRAVEL, MILES, LABOR</td> <td></td> <td></td> </tr> <tr> <td colspan="4">TOTAL</td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | | | | ADDITIONAL PARTS | | | | ACTION ITEMS | | QTY | PART # | DESCRIPTION | UNIT | TOTAL | DESCRIPTION | 1 | 501035-067 | Sample | SS | | INFO | 1 | KST00.. | Pressure Transducer | | | PART | 1 | 120-80-05 | oil | oil | | SVC | 40 | TRAVEL | TRAVEL PER HOUR PER TECH | | \$99.00 | INFO | 10 | MILEAGE | MILEAGE | | \$1.50 | PART | | LABOR | LABOR PER HOUR | | \$99.00 | SVC | | OVERTIME TRAVEL | OT TRAVEL PER HOUR PER TECH | Travel x1.5 OT x2 | | | | OVERTIME LABOR | EMERGENCIES - 4 HOUR MINIMUM | LABOR x1.5 OT x2 | | | | PER DIEM - OTHER | EXPENSES | | \$175.00 | | 1 | SUPPLIES & SAFETY/ENVIRONMENTAL (Min \$15 / Max \$225) | | | 75.00 | | SUB-TOTAL PARTS & SUPPLIES | | | | | | SUB-TOTAL - TRAVEL, MILES, LABOR | | | | | | TOTAL | | | | | |
| ADDITIONAL PARTS | | | | ACTION ITEMS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QTY | PART # | DESCRIPTION | UNIT | TOTAL | DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 501035-067 | Sample | SS | | INFO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | KST00.. | Pressure Transducer | | | PART | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 120-80-05 | oil | oil | | SVC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | TRAVEL | TRAVEL PER HOUR PER TECH | | \$99.00 | INFO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | MILEAGE | MILEAGE | | \$1.50 | PART | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | LABOR | LABOR PER HOUR | | \$99.00 | SVC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | OVERTIME TRAVEL | OT TRAVEL PER HOUR PER TECH | Travel x1.5 OT x2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | OVERTIME LABOR | EMERGENCIES - 4 HOUR MINIMUM | LABOR x1.5 OT x2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | PER DIEM - OTHER | EXPENSES | | \$175.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | SUPPLIES & SAFETY/ENVIRONMENTAL (Min \$15 / Max \$225) | | | 75.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SUB-TOTAL PARTS & SUPPLIES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SUB-TOTAL - TRAVEL, MILES, LABOR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ACCEPTANCE NAME: _____ DATE: _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I hereby agree to HTE Technologies' Terms & Conditions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Lab Systems: Compressor,
Service History
28 June 2012 pg 2/2;
Alarms/alerts in recent
weeks "High Inlet Air
Temp" which was false,
temp <80F.**

**Alarm/switch RTD 6 and 2
may require new probe, run &
inspect**

**Note: 50 min after service/PM
complete, Alarm messages
Failure to Unload, Check inlet
transducer connection,
6/29/12 called HTE for fix**

HTE Compressed Air Solutions Group
2021 Congressional Dr., St. Louis, MO 63146
2415 N. 22nd St., Decatur, IL 62526
(800) 444-4831 • (314) 731-4424 fax

HTE TECHNOLOGIES

DATE: 2012-07-10
WORK ORDER #: 585668
7/11/12 7:30am
PAGE #

TM

| | | | | | | | | | |
|---|--|---|-------|-----------|--|------------|--|------------|--|
| CONTACT | Bob Morrison | ACT # | C1320 | CHRT | | TECH | | BWC | |
| PHONE # | 314-971-3795 | P.O. # | | | | SAID | | | |
| COMPANY | St. Louis Community College C P L S | For concerns about any service issues please contact: Service Coordinator - Chris Jones ext. 1127 Service Assistant - Shannon Gnaul ext. 1102 For other service issues please contact: Parts Suzanne Luck ext. 1124 | | | | | | | |
| ADDRESS | 1005 N Watson Rd | | | | | | | | |
| CITY, ST, ZIP | Olivette, MO 63132 | | | | | | | | |
| DIRECTIONS | Place Route | Arrival | 8:30 | Time, Tue | | Job Status | | | |
| | | 7:11 | | | | COMPLETE | | INCOMPLETE | |
| MODEL: | KNW00-A/L | Refuse: High Inlet / Temp Probe and XDCR PM Status: Unknown Unknown | | | | | | | |
| SERIAL #: | 09J6111886 | | | | | | | | |
| SERVICE NOTES: | 2012-06-28 585668 MP: Erratic transducer readings 2012-06-28 584467 MP: APM- High Inlet Alarm | | | | | | | | |
| Temp. Unit 2 added because of previous temp probe | | | | | | | | | |
| Installed 2 new pressure transmitter + 1 temp probe | | | | | | | | | |
| 314-971-3795 | | | | | | | | | |

| QTY | PART # | DESCRIPTION | UNIT | TOTAL | ACTION/ITEMS |
|----------------------------------|---------------------------------|------------------------------|----------|-------|--------------|
| 2 | V8018 | Pressure Transmitter | | | INFO |
| 1 | V3409/A | Probe | | | INFO |
| 1 | V3409/A | Probe | | | INFO |
| 0.40 | TRAVEL | TRAVEL PER HOUR PER TECH | 000 (0) | | INFO |
| 10 | MILEAGE | MILEAGE | 01 (0) | | INFO |
| | LABOR | LABOR PER HOUR | 000 (0) | | INFO |
| | OVERTIME TRAVEL | OT TRAVEL PER HOUR PER TECH | 000 (0) | | INFO |
| | OVERTIME LABOR | EMERGENCIES - 4 Hour Minimum | 000 (0) | | INFO |
| | PER DIEM - Other | EXPENSES | 000 (0) | | INFO |
| 1 | Supplies & Safety/Environmental | (Min \$15 / Max \$225) | \$ 0 (0) | | INFO |
| Sub-TOTAL PARTS & SUPPLIES | | | | | |
| Sub-TOTAL - TRAVEL, MILES, LABOR | | | | | |
| TOTAL | | | | | |

Acceptance Name: _____ Date: _____

Thermax Engineering

Lab Systems: Compressor, Service History

11 July 2012 , Replaced 2 pressure transmitters and 1 temp probe

Since the compressor has morphed from something I didn't think about to an animal needing daily care, here's the latest news report.

The HTE technician came this morning shortly after 7am and replaced two pressure transmitters and a temperature probe. He called the previous worker on the machine (last week) to discuss the frequent LOAD/UNLOADs we are experiencing. There is no specific information on his work order report indicating that the troublesome RTD6 sensor (noted on the alert messages) was replaced. On leaving, he said they wanted to let the machine run a few days to see if the changes done today resolve our alerts and alarm problems.

MAIL REMITTANCE TO



Dept #23930
PO Box 790100
St. Louis MO 63178-0100

INVOICE

ENTERING OFFICE

HTE TECHNOLOGIES
2021 CONGRESSIONAL DR

ST. LOUIS MO 63148

| | |
|----------------|-----------|
| INVOICE NUMBER | TRAN CODE |
| 584467-002 | DI |
| INVOICE DATE | PAGE |
| 08/29/12 | 1 |

Any different or additional terms that may be embodied in your purchase order are hereby rejected. If your order is not an acceptance of our proposal, this will operate as an acceptance of your order only in the event you agree to the terms herein. The terms and conditions contained above and attached shall apply.

| The terms and conditions contained above and attached shall apply. | | | | | | | | | | |
|--|---------------|-----------------------|---------------|---|-------------------------|------------------------|------------|-----------------------|-----------------------|---------|
| LINE NO. | TOTAL ORDERED | QUANTITY BACK ORDERED | THIS SHIPMENT | PART NUMBER DESCRIPTION | UNIT OF MEASURE PRODUCT | | | UNIT PRICE DISCOUNT % | EXTENDED AMOUNT | |
| | | | | ***** | | | | | | |
| | | | | **SERVICE CALL 06/28/12 WORK ORDER #584467* | | | | | | |
| | | | | ***** | | | | | | |
| | | | | **MOD:KNW00-A/L S/N:09J6111886 ** | | | | | | |
| | | | | ***** | | | | | | |
| | | | | **CUSTOMER REF: ** | | | | | | |
| | | | | ***** | | | | | | |
| 10 | 1 | | 1 | KB700 | | | | 1852.0000 | | 1852.00 |
| | | | | ANNUAL MAINT KT | 4WO | EA | | | | |
| 20 | 1 | | 1 | ISO-VG-68 | | | | 125.0000 | | 125.00 |
| | | | | LUBE | 4WO | EA | | | | |
| 30 | .4 | | .4 | TT-MAP | | | | 99.0000 | | 39.60 |
| | | | | TRAVEL PER TECH | 4ZFT | HR | | | | |
| 40 | 10 | | 10 | MC-MAP | | | | 1.5000 | | 15.00 |
| | | | | MILEAGE CHARGE | 4ZFM | ML | | | | |
| 50 | 4.8 | | 4.8 | LC-MAP | | | | 99.0000 | | 475.20 |
| | | | | LABOR CHARGE | 4ZFL | HR | | | | |
| 60 | 1 | | 1 | 02250138-667 | | | | 49.5000 | | 49.50 |
| | | | | OIL SAMPLE KIT | 4WSP | EA | | | | |
| END | | | | | | | | | | |
| CUST. NO. | | ORDER DATE | | TERM | PC | ORD | Written By | DATE SHIPPED | WHS# | AMOUNT |
| C1320 | | 06/21/12 | | 1 | 01 | S | ZZZ | 06/28/12 | 01 | 2556.30 |
| Center: HTE DELVRY | | | | | | FOR: UPS GROUND PP + A | | | ORIGINAL INVOICE | |
| Tracking: | | | | | | | | | FRIGHT/INS/INOL 54.90 | |
| | | | | | | | | | SALES TAX 154.55 | |
| Terms of Payment: NET 30 DAYS | | | | | | | | | INVOICE TOTAL 2765.75 | |

** REPRINT **

ORDER ISSUED IN: ST. LOUIS
PHONE: 314-731-4444

RECEIVED 10 27 2012

Customer PO No. ROBERT MORRISON

Mark No.

S CENTER FOR PLANT AND LIFE
O SCIENCES (CPLS) BRDG PARK
L 1005 N. WARSON RD
D CREVE COEUR MO 63132
T
O

S CENTER FOR PLANT AND LIFE
H SCIENCES (CPLS) BRDG PARK
I 1005 N. WARSON RD
P CREVE COEUR MO 63132
T
O

Lab Systems: Compressor, Invoice for June-July 2012 work

HTE Compressed Air Solutions Group
2021 Congressional Dr., St. Louis, MO 63146
2415 N. 22nd St., Decatur, IL 62526
(800) 444-4831 • (314) 731-4424 fax

HTE
TECHNOLOGIES

DATE 2012-10-03 WORK ORDER # 591973
10/3/12
TM PAGE #

CONTACT: Bob Morrison
PHONE # 314-971-3795
COMPANY St. Louis Community College C P L S
ADDRESS 1005 N Watson Rd
CITY, ST, ZIP Olivette, MO 63132

ACT # C1320
P.O. #
HTE SERVICE CONTACTS
Division Manager John Masterson ext. 1120
Service Manager Tom Webb ext. 1151
Operations Manager Shannon Gnaou ext. 1126
Service Coordinator Steve Jones ext. 1127
Parts Coordinator Chris Jones ext. 1143

DESCRIPTION: Part 8255
ARRIVAL 10/15
DEPARTURE 10/16
TOTAL Fee
Joe Davis
COMPLETE
INCOMPLETE

MODEL: KNW00-A/L
SERIAL #: 09J6111886
SERVICE NOTES: 7380 Pounds 321 and 1/2
2012-07-10 585668 SWC High Inlet / Temp Probe and XDCR
2012-06-28 585668 MP Erafic transducer readings

Problems:
Frequent high inlet temp Alerts, frequent load cycles

| QTY | PART # | DESCRIPTION | UNIT | TOTAL | DESCRIPTION |
|------|----------------------------------|---------------------------------|------------|-------|-------------|
| | | | | | INFO |
| | | | | | Part |
| | | | | | SVC |
| | | | | | INFO |
| | | | | | Part |
| | | | | | SVC |
| 0.40 | TRAVEL | TRAVEL PER HOUR PER TECH | (\$105.00) | | INFO |
| 10 | MILEAGE | MILEAGE | (\$1.00) | | Part |
| | LABOR | LABOR PER HOUR | (\$105.00) | | SVC |
| | OVERTIME TRAVEL | OT TRAVEL PER HOUR PER TECH | (\$105.00) | | |
| | OVERTIME LABOR | Excesses - 4 Hour Maximum | (\$105.00) | | |
| | Per Diem - Other | EXPENSES | (\$0.00) | | |
| 1 | Supplies & Service Environmental | (Min \$15 / Max \$200) | \$ 0.00 | | |
| | | SUB-TOTAL PARTS & SUPPLIES | | | |
| | | SUB-TOTAL - TRAVEL, MEAL, LABOR | | | |
| | | TOTAL | | | |

Accompany Name: DATE:

13014 6151 Passwords

Lab Systems: Compressor, Service 10/3/12; Inlet high temp alerts, frequent load/unload cycles

New/different H T E technician
Checked settings, reset range on
Load (75 was 95) to reduce
Cycles. Did not witness high temp RDT6
Inlet temps while on site. Left with those running
In the 90F range.

MAIL REMITTANCE TO:



Dept #23930
PO Box 790100
St. Louis MO 63179-0100

INVOICE
ENTERING OFFICE

HTE TECHNOLOGIES
2021 CONGRESSIONAL DR

ST. LOUIS MO 63146

| | |
|----------------|-----------|
| INVOICE NUMBER | TRAN CODE |
| 594270-002 | DI |
| INVOICE DATE | PAGE |
| 09/28/12 | 1 |

Any different or additional terms that may be embodied in your purchase order are hereby objected to. If your order is not an acceptance of our proposal, this will operate as an acceptance of your order only in the event you agree to the terms hereof. The terms and conditions contained above and attached shall apply.

| The terms and conditions contained above and attached shall apply. | | | | | | | | | |
|--|---------------|------------------------|---------------|--|-------------------------|------------------|-----------------------|-----------------------|------------------------|
| LINE NO. | QUANTITY | | | PART NUMBER DESCRIPTION | UNIT OF MEASURE PRODUCT | | UNIT PRICE DISCOUNT % | EXTENDED AMOUNT | |
| | TOTAL ORDERED | BACK ORDERED | TH S SHIPMENT | | | | | | |
| | | | | ***** | | | | | |
| | | | | **SERVICE CALL 10/03/12WORK ORDER #594270* | | | | | |
| | | | | ***** | | | | | |
| | | | | **MOD:KNW00-A/L S/N:09J6111886 ** | | | | | |
| | | | | ***** | | | | | |
| | | | | **CUSTOMER REF: ** | | | | | |
| | | | | ***** | | | | | |
| 10 | 2.8 | | 2.8 | LC-DJM | | | 109.0000 | 305.20 | |
| | | | | LABOR CHARGE | 4ZFL | HR | | | |
| 20 | .4 | | .4 | TT-DJM | | | 109.0000 | 43.60 | |
| | | | | TRAVEL PER TECH | 4ZFT | HR | | | |
| 30 | 10 | | 10 | MC-DJM | | | 1.5000 | 15.00 | |
| | | | | MILEAGE CHARGE | 4ZFM | ML | | | |
| 40 | 1 | | 1 | SERVICE-SUPPLIES | | | 21.8300 | 21.83 | |
| | | | | SUPPLIES USED | 4WXS | EA | | | |
| FOLD | | | | | | | | | |
| CUST. NO. C1320 | | ORDER DATE 09/28/12 | | TERR 1 | PC 01 | ORD S | Written By ZZZ | DATE SHIPPED 10/03/12 | WHS: 01 |
| Carrier: HTE DELVRY | | F0B: UPS GROUND PP + A | | | | ORIGINAL INVOICE | | | AMOUNT 385.63 |
| Tracking: | | | | | | | | | FRGHT/INS/HNDL .00 |
| | | | | | | | | | SALES TAX 1.62 |
| Terms of Payment: NET 30 DAYS | | | | | | | | | INVOICE TOTAL 387.25 |
| | | | | | | | | | Please Pay This Amount |

ORDER ISSUED IN: ST. LOUIS
PHONE: 314-731-4444

OK
DPM
12/6/12

Customer PO No. VERBAL BOB MORRISON

Mark No.

S CENTER FOR PLANT & LIFE
O SCIENCES/STLCC, ROOM 122
L 1005 N. WARSON RD
D CREVE COEUR MO 63132
O

S CENTER FOR PLANT & LIFE
H SCIENCES/STLCC, ROOM 122
I 1005 N. WARSON RD
T CREVE COEUR MO 63132
O

RECEIVED DEC 05 2012

Lab Systems: Compressor, Service Invoice for 10/3/12;

November 30, 2012

TO: Accounts Payable

SUBJECT: Sales Tax Exempt Certificate Update and Accounts Payable Contact(s)

We would like to take this opportunity to THANK YOU for your business!

Currently, we are updating our files in order to comply with state and local sales tax law requirements. It is necessary that we have in our files a properly executed exemption certificate from all of our customers who claim sales tax exemption. If we do not have this certificate, we are obligated to collect the tax for the state in which the property is delivered.

If you are entitled to sales tax exemption, please forward an up-to-date copy of your recent certificate and send it to us as soon as possible. If your purchase(s) are tax exempt for a reason(s) not stated on the forms, please send us your special certificate, exemption letter, or any other legal document.

In addition to updating your tax exempt certificates, we would like to update our payables contacts with your company. Please list Contact Name(s), Phone Number(s), Fax Number(s), and E-mail address(s).

Thank you in advance for your prompt attention to these requests. The preferred delivery method of the tax exempt forms is via e-mail in a PDF format. Listing of the contact information can be in the body of the e-mail/fax/letter.

E-Mail : Please list your Customer Number in the subject line of your e-mail.
tax@htetechnologies.com

Fax: 314-731-4424 ATTN: Tax Update

Mailing Address: HTE Technologies ATTN: Tax Update
2021 Congressional Drive
St Louis MO 63146
(Please do not use our remittance PO BOX, send to our physical address only.)

If you have any questions, please do not hesitate to contact me in anyway listed below. Thank you!

Sincerely,

Jessica O'Connor JOConnor@htetech.com

**** Please update your records:**

Remittance send to ar@htetech.com

Accounts Receivable contact is Hannah Siekerman hess@htetech.com Phone 314-731-4444 Fax 314-731-4424

HTE is:

DIVERSIFIED – To Provide A Broad Range Of Industrial Products
DIVISIONALIZED – To Ensure Field Sales Expertise & Technical Support
DETERMINED – To Earn Your Business!

Lab Systems: Compressor, Service H T E tax info

| | | | | | | | | | |
|---------------|-------------------------------------|---|--|----------------|------|------------|------|-----------|------------|
| CONTACT | Bob Morrison | Acc # | C1320 | CROR | | TRCH | | Page # | DJM |
| PHONE # | 314-971-3795 | P.O. # | | | | TRCH | SAUS | | |
| CORPORATION | St. Louis Community College C P L S | For concerns about any service issues please contact: | | | | | | | |
| ADDRESS | 1005 N Watson Rd | HTE | Division Manager | John Masterson | ext. | 1120 | | | |
| CITY, ST, ZIP | Olivette, MO 63132 | SERVICE | Service Manager | Tom Webb | ext. | 1151 | | | |
| | | CONTACTS | Operations Manager | Shannon Gnaul | ext. | 1126 | | | |
| | | | Service Coordinator | Steve Jones | ext. | 1127 | | | |
| | | | Parts Coordinator | Chris Jones | ext. | 1143 | | | |
| DIRECTIONS | Pyram Road | ARRIVE | 9:00 | DEPART | | TOTAL TIME | | Joe Smith | |
| MODEL | KNW00-A/L | PURPOSE | Check machine for short cycling / over heating | | | | | | |
| SERIAL # | 09J6111886 | PM STATUS | Unknown | Unknown | | | | COMPLETE | INCOMPLETE |

SERVICE NOTES: 7549 run hrs 349 load hrs
92124 Cycles. Inspect for RTDG (inlet temperature failure) check
wiring of sensor. Check / reset probe and observe response of sensor.
Inspect probe to digital temp gun display numbers. Same range.
80°F surface temp 78°F RTDG internal temp. Alarm set point at highest
value allowed 122°F ambient. RTDG redundant. Set pressures to
15/100 lead 75/75 lag. Unload time 15 minutes. Check location
of cabinet fan. Complete inspection sheet.

Will send us Temp probe
RTDG to store at BRDG

| ADDITIONAL PARTS | | | | | ACTION ITEMS | |
|----------------------------------|-------------------------------|------------------------------|------|----------|------------------------|----------------------------------|
| QTY | PART # | DESCRIPTION | UNIT | TOTAL | DESCRIPTION | |
| | | | | | INFO | Deliver temp probe to customer - |
| | | | | | PART | customer will hold sensor until |
| | | | | | SVC | ready to install. Do not install |
| | | | | | INFO | at this time. |
| | | | | | PART | |
| | | | | | SVC | |
| 0.40 | TRAVEL | TRAVEL PER HOUR PER TECH | | \$109.00 | INFO | Another "Dave" at office |
| 10 | TRAVEL | TRAVEL PER HOUR PER TECH | | \$109.00 | PART | has LS Rebecco |
| | LABOR | LABOR PER HOUR | | \$109.00 | SVC | training |
| | OVERTIME TRAVEL | OT TRAVEL PER HOUR PER TECH | | \$109.00 | | |
| | OVERTIME LABOR | EMERGENCIES - 4 Hour Minimum | | \$109.00 | | |
| | PER DIEM - OTHER | EXPENSES | | \$109.00 | | |
| 1 | SAMPLES & SMITH ENVIRONMENTAL | (Min \$15 / Max \$225) | | \$ 0.00 | | |
| SUB-TOTAL PARTS & SUPPLIES | | | | | New POS | |
| SUB-TOTAL - TRAVEL, MILES, LABOR | | | | | ACCEPTANCE NAME: DATE: | |
| TOTAL | | | | | Bob Morrison | |

**Lab Systems:
Compressor, Service
10/15/12; Inlet high temp
alerts**

OIL FREE ROTARY SCREW COMPRESSOR INSPECTION

| Pass | Monitor | Fail | |
|--------------------------|-------------------------------------|--------------------------|--|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1 Review system alarms and controller parameters |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2 Environment - Temperature <u>84</u> °F Ventilation <u>3100</u> Airborne Contaminates <u>normal</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3 Discharge temperature <u>68</u> °F |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4 Main motor amp draw loaded T1 <u>29</u> T2 <u>28.5</u> T3 <u>29</u> @ <u>100</u> PSIG |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5 Main motor amp draw unloaded T1 _____ T2 _____ T3 _____ @ _____ PSIG |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6 Main motor voltage loaded T1/T2 <u>470</u> T1/T3 <u>470</u> T2/T3 <u>470</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7 Main motor starter voltage drop (running) L1/T1 <u>.04</u> L2/T2 <u>.04</u> L3/T3 <u>.04</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8 Main motor overload amperage setting <u>20</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 9 Fan motor amp draw T1 <u>0.7</u> T2 <u>0.7</u> T3 <u>0.7</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10 Fan motor voltage T1/T2 <u>470</u> T1/T3 <u>470</u> T2/T3 <u>470</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 11 Fan motor starter voltage drop (running) L1/T1 <u>1.1</u> L2/T2 <u>1.18</u> L3/T3 <u>1.14</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 12 Fan motor overload amperage setting <u>1.0</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 13 Control voltage <u>24.05VDC</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 14 Control amperage _____ |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 15 Inspect electrical connections |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 16 Load pressure <u>76</u> PSIG |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 17 Unload pressure <u>100</u> PSIG |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 18 1st stage discharge temperature <u>330</u> °F <u>365</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 19 2nd stage discharge temperature <u>320</u> °F <u>355</u> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 20 1st stage discharge pressure <u>28.4</u> PSIG |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 21 2nd stage discharge pressure <u>17.1</u> PSIG |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 22 Intercooler pressure _____ PSIG |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 23 Oil pressure <u>20</u> PSIG |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 24 Check moisture trap operation |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 25 Check intercooler drain |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 26 Check operation of inlet valve |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 27 Check operation of unloader valve |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 28 Check operation of check valve |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 29 Check condition of hoses |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 30 Inspect/adjust drive system |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 31 Inspect for abnormal noise and vibration |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 32 Inspect/Calibrate all safety switches |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 33 Inspect control air lines and check valve for leaks |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 34 Inspect safety relief valve on machine |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 35 Inspect safety relief valve & pressure gauge on receiver tank |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 36 Check for air leaks |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 37 Check for oil leaks |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 38 Check oil level and top off as necessary |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 39 OPTIONAL shock pulse readings (to be reported within 7 days) |

Notes: DJ/MNH/10/15/12

*Will send us temp probe
ATOG to store at BORG*

*DJ/MNH/10/15/12 "Dave" at office
has 13 Rohm
trans*

Lab Systems: Compressor, Service 10/15/12; Checklist

HTE Compressed Air Solutions Group
2021 Congressional Dr., St. Louis, MO 63146
2415 N. 22nd St., Decatur, IL 62526
(800) 444-4831 • (314) 731-4424 fax



DATE
2013-03-20

WORK ORL #
609196

TM

PAGE #

Lab Systems: Compressor Service 3/2/2013

called in by Scott Mesplay
Cassidy-Turley to investigate
water flow for cooling which
is exhausted to drain
Building is seeing 5x
previous water use this
Winter

| CONTACT PHONE # | Scott 314-487-4464 | ACCT # | C1320 | CREDIT | TECH | BOOK |
|---|--|---|---------------------|----------------|--------------------------------|------------|
| COMPANY | St. Louis Community College C P L S | P.O. # | | | SALES | |
| ADDRESS | 1005 N Warson Rd | For concerns about any service issues please contact: | | | | |
| CITY, ST, ZIP | Olivette, MO 63132 | HTE SERVICE CONTACTS | Division Manager | John Masterson | ext. | 1120 |
| | | | Service Manager | Tom Webb | ext. | 1151 |
| | | | Operations Manager | Shannon Gnau | ext. | 1126 |
| | | | Service Coordinator | Steve Jones | ext. | 1127 |
| | | | Parts Coordinator | Chris Jones | ext. | 1143 |
| DIRECTIONS | PLANT RULES | ARRIVAL | DEPARTURE | TOTAL TIME | JOB STATUS | |
| | | 8:15 | | | COMPLETE | INCOMPLETE |
| MODEL: KNW00-A/L | PURPOSE: Check machine for Service light on | | | | | |
| SERIAL #: 09J6111886 | PM STATUS: Unknown Unknown | | | | | |
| SERVICE NOTES | 2013-03-18 609196 BWC Check Machine for Water leak 2012-10-15 594270 DJM Check machine for short cycling / over heating 314-486-3357 / SCOTT Running hours 27244.2 Load hours 650.2 100psi load - 75psi Unload Water valves will Always flow same amount through them, will not change Recommend using water tower all year w/ proper chemicals Temps and pressure look good at this time. | | | | | |
| ADDITIONAL PARTS | | | | | ACTION ITEMS | |
| QTY | PART # | DESCRIPTION | UNIT | TOTAL | DESCRIPTION | |
| | | | | | INFO | |
| | | | | | PART | |
| | | | | | SVC | |
| | | | | | INFO | |
| | | | | | PART | |
| | | | | | SVC | |
| 0.40 | TRAVEL | TRAVEL PER HOUR PER TECH | | \$109.00 | INFO | |
| 10 | MILEAGE | MILEAGE | | \$1.30 | PART | |
| | LABOR | LABOR PER HOUR | | \$109.00 | SVC | |
| | OVERTIME TRAVEL | OT TRAVEL PER HOUR PER TECH | Hour at 1.5 | | | |
| | OVERTIME LABOR | EMERGENCIES - 4 HOUR MINIMUM | Unk at 1.5 | | | |
| | PER DIEM - OTHER | EXPENSES | | 150.00 | | |
| 1 | SUPPLIES & SAFETY/ENVIRONMENTAL (Min \$15 / Max \$225) | | | % | 6.00 | |
| SUB-TOTAL PARTS & SUPPLIES | | | | | | |
| SUB-TOTAL - TRAVEL, MILES, LABOR | | | | | | |
| TOTAL | | | | | | |
| ORDER PARTS SAME P.O. | | | | | SEND PARTS/SERVICE IMMEDIATELY | |
| ORDER PARTS NEW P.O. # | | | | | CALL W/ESTIMATE FIRST | |
| NEW PO# | | | | | | |
| ACCEPTANCE NAME: | | | | | DATE: | |
| | | | | | | |
| I hereby agree to HTE Technologies Terms & Conditions | | | | | | |

Compressor: 14 June 2013, Install new CCV Diaphragm

| | | | | | | | | |
|----------------------|-----------------------------------|---|--------------------|----------------|------|------------|--|------------|
| CONTACT | Bob Morrison | ACCT# | C1320 | CREDIT | | TECH | | SRW |
| PHONE# | | P.O.# | | | | SALES | | |
| COMPANY | St. Louis Community College C PLS | For concerns about any service issues please contact: | | | | | | |
| ADDRESS | 1005 N Warson Rd | HTE | Division Manager | John Masterson | ext. | 1120 | | |
| CITY, ST, ZIP | Olivette, MO 63132 | SERVICE CONTACTS | Operations Manager | Shannon Gnau | ext. | 1126 | | |
| | | | Parts Coordinator | Chris Jones | ext. | 1143 | | |
| DIRECTIONS | PLANT RULES | ARRIVAL | DEPARTURE | TOTAL TIME | | JOB STATUS | | |
| | | 10:45 | 12:30 | 1:45 | | COMPLETE | | INCOMPLETE |
| MODEL: KNW00-A/L | PURPOSE: complete valve rebuild | | | | | | | |
| SERIAL #: 09J6111886 | PM STATUS: Unknown Unknown | | | | | | | |

SERVICE NOTES: 2013-03-20 609196 BDK Check machine for Service light on
2013-03-18 609196 BWC Check Machine for Water leak

900 hours
Installed New CCV diaphragm.

TEST Run Unit OK

| | | | | | | | | |
|----------------------|-----------------------------------|---|--------------------|----------------|------|------------|--|------------|
| CONTACT | Bob Morrison | ACCT# | C1320 | CREDIT | | TECH | | BDK |
| PHONE# | 314-NO TELEMARKEING 513-6950 | P.O.# | | | | SALES | | |
| COMPANY | St. Louis Community College C PLS | For concerns about any service issues please contact: | | | | | | |
| ADDRESS | 1005 N Warson Rd | HTE | Division Manager | John Masterson | ext. | 1120 | | |
| CITY, ST, ZIP | Olivette, MO 63132 | SERVICE CONTACTS | Service Manager | Tom Webb | ext. | 1151 | | |
| | | | Operations Manager | Shannon Gnau | ext. | 1126 | | |
| | | | Parts Coordinator | Chris Jones | ext. | 1143 | | |
| DIRECTIONS | PLANT RULES | ARRIVAL | DEPARTURE | TOTAL TIME | | JOB STATUS | | |
| | | 10:45 | 1:55 | | | COMPLETE | | INCOMPLETE |
| MODEL: KNW00-A/L | PURPOSE: not making air | | | | | | | |
| SERIAL #: 09J6111886 | PM STATUS: Unknown Unknown | | | | | | | |

SERVICE NOTES: 2013-03-20 609196 BDK Check machine for Service light on
2013-03-18 609196 BWC Check Machine for Water leak

runnings 13113 &
hours 900.6
Comp would not build
likely found in lost inside CCV
Will order the part
Do not run machine until new but is installed
Machine will only run backwards when it thinks it
has lost the good air comp.

| ADDITIONAL PARTS | | | | | ACTION ITEMS | |
|----------------------------------|--|------------------------------|----------------------|-------|--|--|
| QTY | PART# | DESCRIPTION | UNIT | TOTAL | DESCRIPTION | |
| | | | | | INFO | |
| | | | | | PART | |
| | | | | | SVC | |
| | | | | | INFO | |
| | | | | | PART | |
| | | | | | SVC | |
| 0.40 | TRAVEL | TRAVEL PER HOUR PER TECH | \$109.00 | | INFO | |
| 10 | MILEAGE | MILEAGE | \$1.50 | | PART | |
| | LABOR | LABOR PER HOUR | \$109.00 | | SVC | |
| | OVERTIME TRAVEL | O T TRAVEL PER HOUR PER TECH | TRAVEL X1.5 OR X2 | | | |
| | OVERTIME LABOR | EMERGENCIES - 4 HOUR MINIMUM | LABOR X1.5 OR X2 | | | |
| | PER DIEM - O THER | EXPENSES | 150.00 | | | |
| 1 | SUPPLIES & SAFETY/ENVIRONMENTAL (MIN \$15 / MAX \$225) | % | 6.00 | | | |
| Do Not Write In This Area | | | | | New PO# | |
| SUB-TOTAL PARTS & SUPPLIES | | | | | ACCEPTANCE NAME | |
| SUB-TOTAL - TRAVEL, MILES, LABOR | | | | | DATE | |
| PARTS/Labor/Consumables | | | | | I hereby agree to HTE Technologies' Terms & Conditions | |
| TOTAL | | | | | | |

| ADDITIONAL PARTS | | | | | ACTION ITEMS | |
|------------------|--------|--------------------------|----------|-------|--------------|--|
| QTY | PART# | DESCRIPTION | UNIT | TOTAL | DESCRIPTION | |
| | | | | | INFO | |
| | | | | | PART | |
| | | | | | SVC | |
| | | | | | INFO | |
| | | | | | PART | |
| | | | | | SVC | |
| 0.40 | TRAVEL | TRAVEL PER HOUR PER TECH | \$109.00 | | INFO | |

HTE Compressed Air Solutions Group
2021 Congressional Dr., St. Louis, MO 63146
2415 N. 22nd St., Decatur, IL 62526



DATE
2013-07-29

WORK ORDER #
622049

(800) 444-4831 • (314) 731-4424 fax

TM

PAGE #

| | | | | | | | |
|----------------------|-------------------------------------|----------------------------|--|---------------|------------|------------|-----|
| CONTACT | | ACCT # | C1320 | CREDIT | | TECH | BDK |
| PHONE # | | P.O. # | | | | SALES | |
| COMPANY | St. Louis Community College C P L S | HTE SERVICE CONTACTS | <u>For concerns about any service issues please contact:</u> | | | | |
| ADDRESS | 1005 N Warson Rd, Rm 122 | | Field Services Manager | Walter Deeken | ext. | 1136 | |
| CITY, ST, ZIP | Olivette, MO 63132 | | Operations Manager | Shannon Gnau | ext. | 1126 | |
| | | | Parts Coordinator | Chris Jones | ext. | 1143 | |
| DIRECTIONS | PLANT RULES | ARRIVAL | DEPARTURE | TOTAL TIME | JOB STATUS | | |
| | | 8:45 | 9:25 | | COMPLETE | INCOMPLETE | |
| MODEL: KNW00-A/L | PURPOSE: Check high temp sensor | | | | | | |
| SERIAL #: 09J6111886 | PM STATUS: Unknown Unknown | | | | | | |

SERVICE NOTES:

San hours 13981.1
Loaded hours 946.7 had/unload cycle count 198580
Comp on standby upon arrival. Inlet temp. showing 95°F, temp started and temp dropped to 70°F. After running for several minutes temp dropped to 54°F.
Ambient room temp is 75°F
Defective RTD6 / Inlet air temp
Machine will alert for this problem but will not turn off or alarm.

| ADDITIONAL PARTS | | | | | ACTION ITEMS | |
|------------------|--------|-------------|------|-------|--------------|--|
| QTY | PART # | DESCRIPTION | UNIT | TOTAL | DESCRIPTION | |
| | | | | | INFO | |
| | | | | | PART | |
| | | | | | SVC | |
| | | | | | INFO | |
| | | | | | PART | |
| | | | | | SVC | |

DEFECTIVE RTD6 / INLET AIR PROBE

Compressor: 29 July 2013 Inlet Temp Probe Alerts

**Note: Alerts will
never shut down
compressor (due
to settings)**

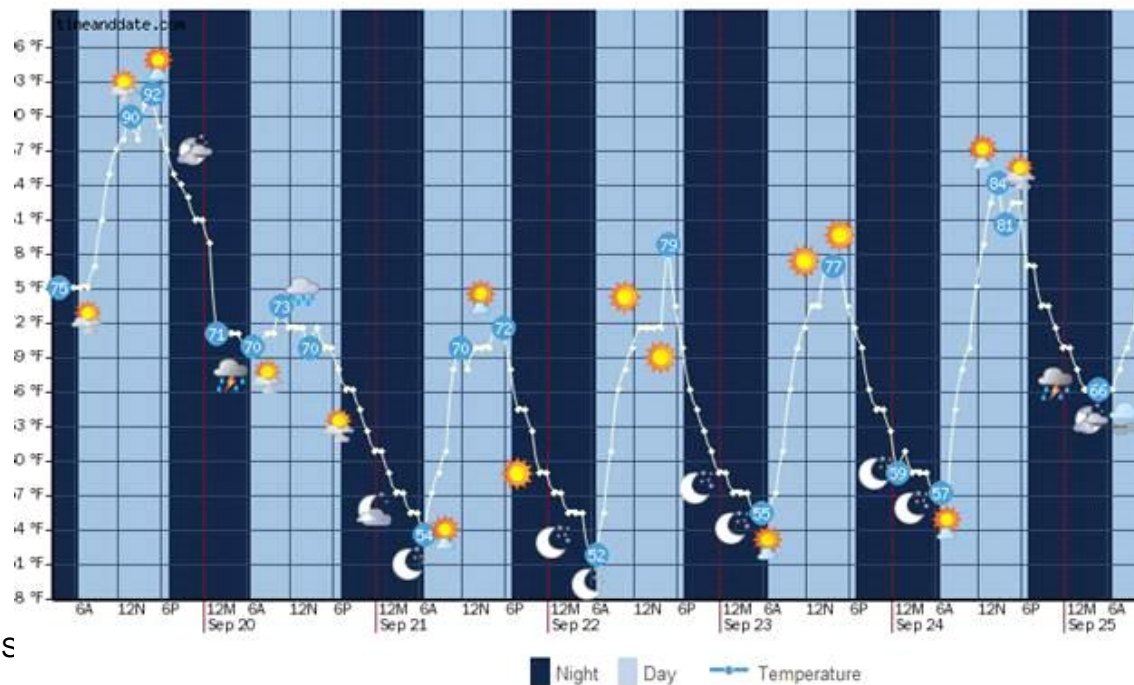
Scott and others,

The chart below from the Weather service shows that we did have low temperatures in our area below the 58F mark that apparently Kristen has set for the cutoff mark for the Chiller “service”. Our compressor shutdown last Saturday 21 September was therefore most likely due to lack of any cooling water. Furthermore, if you look at the average low temperatures for our Zip code for the month of Sept, you will find that the lows start going below 58F about the 19th of September. Akerman and others who now share our Compressor service cannot tolerate shutdowns as their work processes are damaged or destroyed when this happens. Furthermore, our compressor may be damaged by lack of cooling water and we have incurred expenses for calling in H T E for service when the compressor is not at fault.

The design we have for the compressor cooling water was made by the building contractors. It does call for switching to City Water in the Winter months, but it does not support lack of chiller water before then. I suggest you revisit this issue with Kristen and see if she will agree to modify the setting limit until we can make the switch to City Water.

Lab Systems: Compressor Shutdowns, Sept 2013

Recent weather St. Louis



Lab Systems: Compressor Service, 9/24/2013

High Oil Temp (triggerd by lack of cooling water when chiller not running on weekends < 58F)

HTE Compressed Air Solutions Group
2021 Congressional Dr., St. Louis, MO 63146
2415 N. 22nd St., Decatur, IL 62526



DATE
09/24/13

WORK ORDER #
627729

(800) 444-4831 • (314) 731-4424 fax

7 PM

PAGE #

| | | | | | | | |
|---------------|-----------------------------|--|-----------|------------|---------------------|-------|--|
| CONTACT | Bob Morrison | ACCT # | C1320 | CREDIT | | TECH | |
| PHONE # | 314-971-3795 | P.O. # | | | | SALES | |
| COMPANY | St. Louis Community College | HTE SERVICE CONTACTS For concerns about any service issues please contact: Field Service Manager: Walter Deeken ext. 1136 Operations Manager: Shannon Gnau ext. 1126 Parts Coordinator: Chris Jones ext. 1143 | | | | | |
| ADDRESS | 1005 N. Waisen Rd #122 | | | | | | |
| CITY, ST, ZIP | Olivette, Mo. 63132 | | | | | | |
| DIRECTIONS | PLANT RULES | ARRIVAL | DEPARTURE | TOTAL TIME | JOB STATUS | | |
| | | 10:25 | 15:12 | | COMPLETE INCOMPLETE | | |
| MODEL: | KNW00-A/L | PURPOSE: High lube oil temp shutdowns | | | | | |
| SERIAL #: | 09J6111886 | PM STATUS: | | | | | |

SERVICE NOTES: Upon arrival found unit running loading/unloading. Lube oil temp 40°C, Alarm setpoint 76°C, shutdown 82°C. Open Valve to place unit under load constantly. Ran unit at full flow + 94 PSI for 1 hour. Lube oil temp climbed to 46°C slowly. Noted in history both shutdown occurred between 4:15 & 5:15 on Saturday. Water Temp in 46 out 69. Oil temp in 130°F out 102°F. Downloaded trend data from PLC for analysis by factory. will follow up finding analysis. Experienced one false high in let Temp while on site 13:57.

ACTION ITEMS

Lab Systems: Compressor Service 10/1/13 (replaced bad RTD inlet temp sensor)

HTE Compressed Air Solutions Group
2021st Congressional Dr., St. Louis, MO 63146
2415 N. 22nd St., Decatur, IL 62526

(800) 444-4831 • (314) 731-4424 fax



DATE
2013-10-02
10-1
TM

WORK ORDER #
628100

PAGE #

| | | | | | | | |
|-----------------------------|--|----------------------------|--|---------------|---------------------------------|------------|-----|
| CONTACT | Bob Morrison | ACCT # | C1320 | CREDIT | | TECH | SRW |
| PHONE # | | P.O. # | | | | SALES | |
| COMPANY | St. Louis Community College C P L S | HTE SERVICE CONTACTS | <u>For concerns about any service issues please contact:</u> | | | | |
| ADDRESS | 1005 N Warson Rd, Rm 122 | | Field Services Manager | Walter Deeken | ext. | 1136 | |
| CITY, ST, ZIP | Olivette, MO 63132 | | Operations Manager | Shannon Gnau | ext. | 1126 | |
| | | | Parts Coordinator | Chris Jones | ext. | 1143 | |
| DIRECTIONS | PLANT RULES | ARRIVAL | DEPARTURE | TOTAL TIME | JOB STATUS | | |
| | | <i>13³⁰</i> | <i>16³⁰</i> | | COMPLETE | INCOMPLETE | |
| MODEL: KNW00-A/L | PURPOSE: Install new inlet air temp. probe | | | | | | |
| SERIAL #: 09J6111886 | PM STATUS: Unknown Unknown | | | | | | |
| SERVICE NOTES: | | 2013-09-24 | 627729 | SRW | Comp. has a high oil temp alarm | | |
| | | 2013-07-29 | 622049 | BDK | Check high temp sensor | | |
| <i>Replaced RTD</i> | | | | | | | |
| <i>TEST Ran Compressor.</i> | | | | | | | |

Lab Systems: BRDG, Mechanical R111, Compressor Valves Behind



Lab Systems: BRDG, Mechanical R111, Electrical Behind Air Tank



Lab Systems: BRDG, Mechanical R111 ,Vacuum Pump and Tank

Filter Maint: Every 6 months or so

1. Turn off both pumps via red knobs
2. Remove clamps using hammer claw or steel lever. It will take some leverage as the vacuum seals the cover very tightly.
3. Remove and clean/blow filter or replace element

**Elmo Rietschle
Assy Model: 51360075
Repl Air Filter
Element: 730519 (approx \$20)**

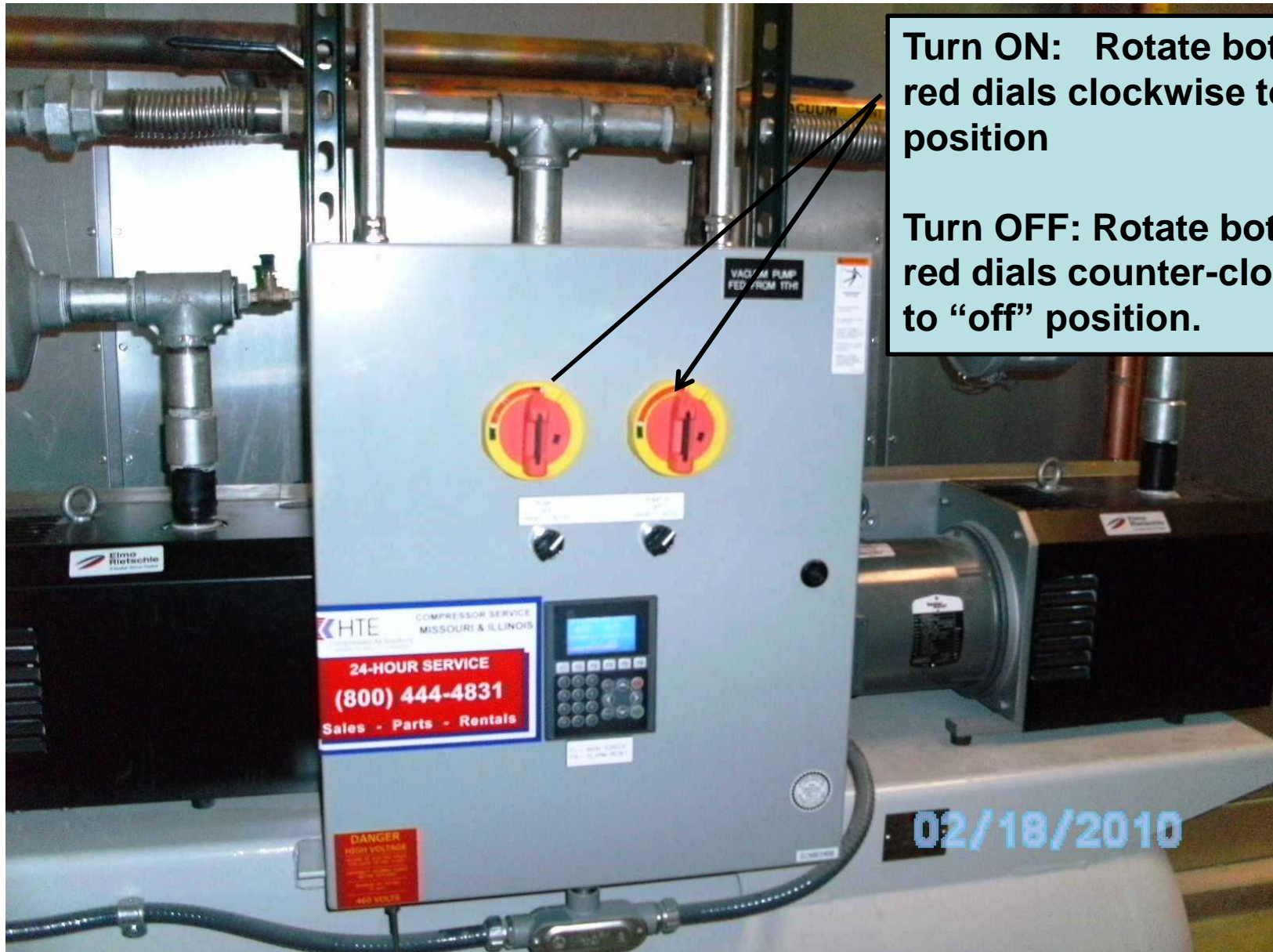
**Elmo Rietschle
VC VACFOX
VXTD-100-122/F
460v/3hp/60hz**

**Elmo Rietschle
VC VACFOX
VXTD-100-122/F
460v/3hp/60hz**

02/18/2010

[*Link to Elmo Rietschle Pump Specs ...pdf*](#)

Lab Systems: BRDG, R111, Vacuum Control Panel, Master ON/OFF Controls (there are two pumps)



Turn ON: Rotate both large red dials clockwise to “on” position

Turn OFF: Rotate both large red dials counter-clockwise to “off” position.

Lab systems: BRDG, Mechanical R111 Water Heaters

Potable Hot
Water

Non-Potable
Hot Water

02/18/2010



1233 North Price Road • St. Louis, MO 63132-2303
314-997-5018 • Fax: 314-692-1100

JAN 25 2013

| | |
|---|----------------|
| INVOICE DATE | INVOICE NUMBER |
| JAN 16, 2013 | 15451 |
| PLEASE REMIT TO: MURPHY COMPANY PO BOX 790379 ST LOUIS, MO 63179 | |
| TERMS: ON RECEIPT | |

Lab systems: BRDG, Mechanical R111 Water Heater Service Record

BILL TO:

CASSIDY TURLEY
7777 BONHOMME AVE STE 100
CLAYTON MO 63105-1971

Page 1 of 1

*Link to Hot Water Heater Repair Bill Dec
2012 Circulating Pump Bill Back from
C Turley.*

| DETAIL | AMOUNT |
|---|--|
| REMOVED AND REPLACED THE HOT WATER CIRCULATING PUMP | |
| BRDG PARK, 1005 N WARSON RD, ST LOUIS MO 63132-2900 | |
| Work Order 25040 HOT WATER PUMP LEAKING | |
| LABOR | 196.00 |
| CIRCULATING PUMP | 1,017.05 |
| Work Order 25040 Total | 1,213.05 |
| <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40%;"> <p>1005 N. Warson #1729</p> <p>12/12 Plumbing repair 71210</p> </div> <div style="width: 30%;"> <p>Date Rec'd</p> <p>Dept</p> <p>Approved</p> <p>Acct. No.</p> </div> <div style="width: 20%;"> <p>#15451</p> <p>\$1,213.05</p> </div> </div> | |
| Thank You For Your Business | <p>Subtotal 1,213.05</p> <p>Tax 0.00</p> <p>Invoice Total 1,213.05</p> |

STLCC BRDG Park Facility

at the Danforth Plant Science Center

DEVELOPER TEAM

Developer

WEXFORD SCIENCE + TECHNOLOGY
7312 PARKWAY DRIVE
HANOVER, MARYLAND 21076
PHONE (410) 579-4005 FAX (410) 579-4890

Architects Planners Engineers

GAUDREAU, INC
810 LIGHT STREET
BALTIMORE, MARYLAND 21230
PHONE (410) 837-5040 FAX (410) 837-8093

Structural Engineers

ALPER AUDI, INC.
1804 BORMAN CIRCLE DRIVE
ST. LOUIS, MISSOURI 63146
PHONE (314) 432-8600 FAX (314) 432-8630

Mechanical, Electrical, and Plumbing Consultant

KIBART, INC
901 DULANEY VALLEY ROAD, SUITE 301
TOWSON, MARYLAND 21204
PHONE (410) 494-1111 FAX (410) 494-1112

Construction Manager

TARLTON CORPORATION
5500 WEST PARK AVENUE
ST. LOUIS, MISSOURI 63110
PHONE (314) 633-3300 FAX (314) 647-1940



WEXFORD SCIENCE + TECHNOLOGY ST. LOUIS COMMUNITY COLLEGE

1005 NORTH WARSON ROAD
CREVE COEUR, MISSOURI 63132
PROGRESS SET

Contact: Bob Morrison, STLCC-FV, Instrumentation Specialist, Bmorrison@stlcc.edu

Lab Systems: BRDG, Dock area, Internal/External, Cooling



**Instrument and Autoclave
Area Extra Cooling
Inside Dock Area
Inspect Vents Regularly**

**Cold Room
Compressor/Condensor
North End of Dock
Clean Vent Monthly**



Lab Systems: BRDG, Roof, Hood Exhaust Vents



Lab HVAC Systems: Lab Water, Hot and Cold Water Mixing Faucet with Vacuum Breaker

Chicago Faucets: Commercial , 930-VR369CP

Features & Specifications

[GN2BVBVR](#) - 6" Rigid / Swing Gooseneck Spout with
Atmospheric Vacuum Breaker

[E7](#) - Full Flow Nozzle

[369-PRVP](#) - 2 3/8" Vandal Proof Lever Handle

[XT](#) - Quatern Compression Operating Cartridge

3/8" O.D. Copper Supply Tubes

All Threaded Connections Factory Assembled

Anti-Rotational Body Deck Pin to Prevent Turning

Atmospheric Vacuum Breaker, Not Intended for Continuous
Pressure Applications



ATMOSPHERIC VACUUM BREAKER FOR ANTI-SIPHONAGE

892-1/2" NPT

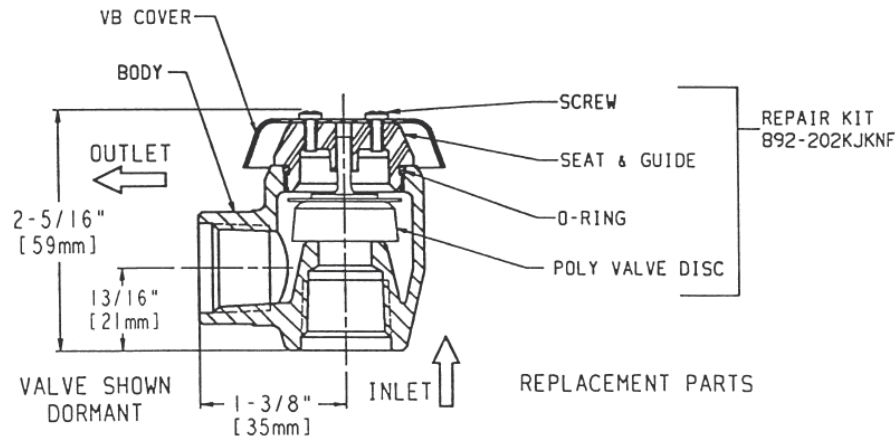
892 G-1/2" NPT

893-3/8" NPT

892-AD NPT

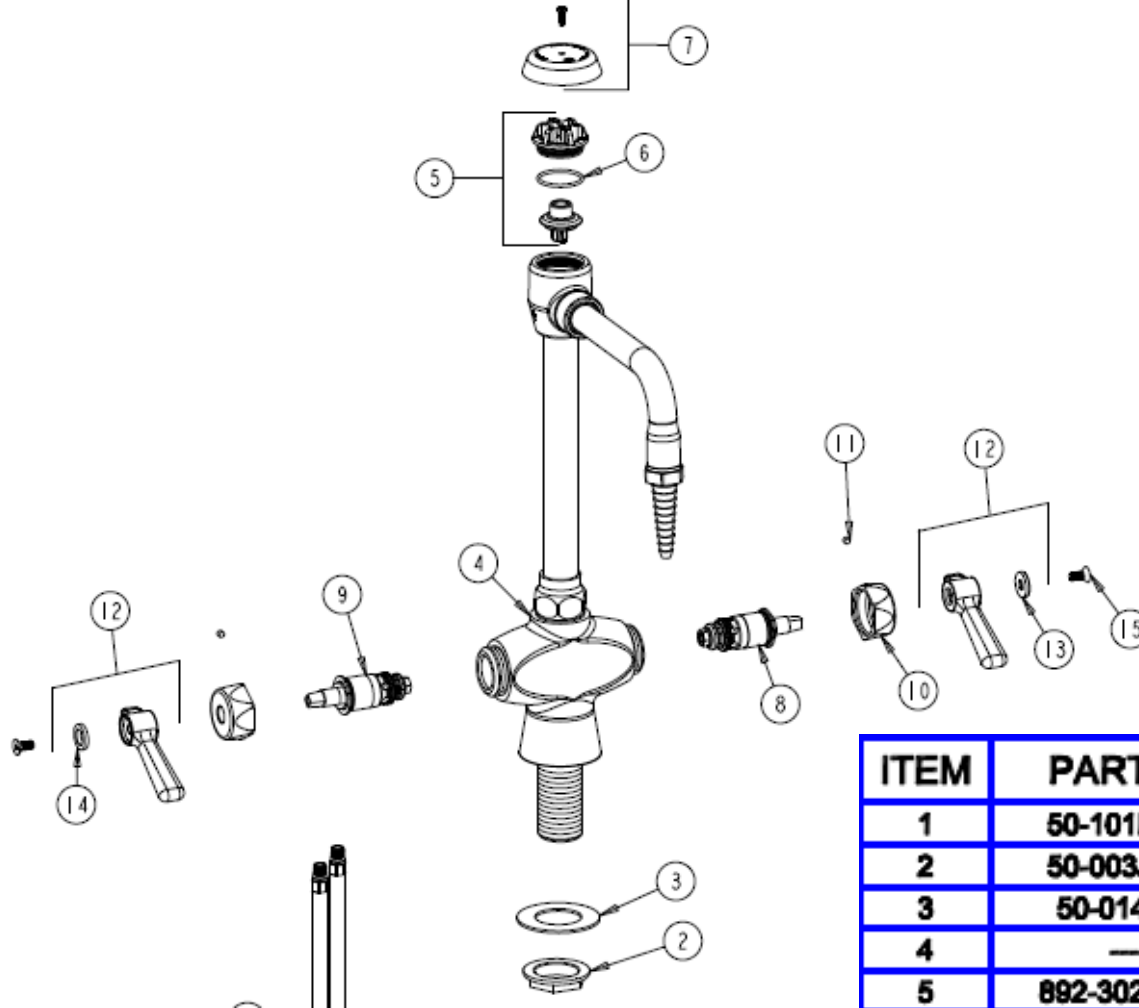
892 WXF-1/2" NPT

892-FD NPT



Lab HVAC Systems: Lab Water, Hot and Cold Water Mixing Faucet

Chicago Faucets:
Commercial , 930-VR369CP



Replacement Cartridges:
Order these two parts from
www.chicagofaucetshoppe.com
About \$15 each plus shipping

| ITEM | PART NO. | DESCRIPTION |
|------|--------------|--------------------------------|
| 1 | 50-101KJKNF | SUPPLY TUBE ASSEMBLY |
| 2 | 50-003JKRBF | LOCKNUT |
| 3 | 50-014JKNF | STEEL WASHER |
| 4 | — | VALVE BODY NOT SOLD SEPARATELY |
| 5 | 892-302KJKNF | VACUUM BREAKER REPAIR KIT |
| 6 | 80-007JKNF | O RING 0.989 X .070 |
| 7 | 892-254JKCP | VACUUM BREAKER COVER w/SCREW |
| 8 | 1-099XTJKNF | QUATURN UNIT (RH) |
| 9 | 1-100XTJKNF | QUATURN UNIT (LH) |
| 10 | 444-105JKCP | VP CAP NUT WITH VR SCREW |
| 11 | 1332-005JKNF | SCREW, VANDAL RESISTANT |
| 12 | 369-PRJKCP | LEVER HANDLE ASSEMBLY (PAIR) |
| 13 | 633-123JKNF | INDEX BUTTON (BLUE) |
| 14 | 633-023JKNF | INDEX BUTTON (RED) |
| 15 | 420-020JKNF | SCREW, 1/8 FLAT HEX HEAD X 1/2 |

Lab HVAC Systems: Lab Water, Vacuum, Re-placement Installation

THIS ANGLE TYPE VALVE IS DESIGNED TO PREVENT BACK-SIPHONAGE OF CONTAMINATED WATER INTO A RELIABLE WATER SUPPLY. THIS TYPE IS NOT RECOMMENDED FOR USE UNDER CONTINUOUS PRESSURE AND DESIGNED TO PROVIDE BACKFLOW PROTECTION DUE TO BACK PRESSURE, EVEN THOUGH A CHECK VALVE MAY BE PRESENT.

APPLICATIONS:

THE 892 AND 893 ATMOSPHERIC VACUUM BREAKERS SHOULD BE INSTALLED ON EVERY OUTLET THAT CAN BE ATTACHED. MAXIMUM TEMPERATURE IS 212°F AT 125 lbs. WORKING PRESSURE. AS COLD WATER DEVICE APPLICATION RANGE 33°F up to 110°F AND AS HOT WATER DEVICE ABOVE 110° F.

INSTALLATION:

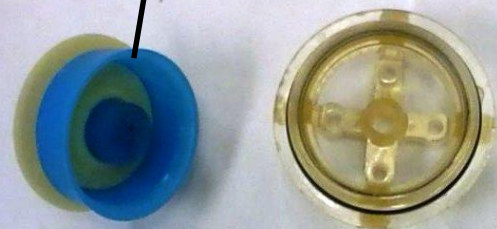
ATMOSPHERIC VACUUM BREAKERS MUST BE INSTALLED BETWEEN THE DISCHARGE SIDE OF THE CONTROL VALVE OF THE FIXTURE AND THE OUTLET. FOR PROPER OPERATION THERE MUST BE NO VALVE BETWEEN THE VACUUM BREAKER AND THE OUTLET. ATMOSPHERIC VACUUM BREAKERS SHOULD BE LOCATED NOT LESS THAN SIX INCHES ABOVE FLOOD RIM OR OVERFLOW. THE FITTING SHOULD BE LOCATED WHERE IT CAN BE INSPECTED AND SERVICED AND WHERE A MOMENTARY SPILL OF WATER FROM AIR INLET WILL NOT BE A PROBLEM.

STANDARDS:

TESTED AND CERTIFIED UNDER ASSE / ANI 101. MEETS OR EXCEEDS C.S.A. S7

Original Part, crimps off
water flow after 5 min

Replacement part,
solved problem w
>15min flow 6/23/12



Lab HVAC Systems: Faucets, Grainger Supplier for Vacuum Repair Kit

Item name: [Vacuum Breaker Repair Kit,](#)

Grainger Item #: 6HKW&

Quantity: 11

Extended Price:

| | Item # | Qty. | Description | Brand |
|---------------------|---------------------|------|-------------|-------|
| Mfr. Model # | Ship | | | |
| Qty. | Availability | | Your | |
| Price | Extended | | | |
| Price | Remove | | | |

6HKW7

[Vacuum Breaker Repair Kit, Plastic>More Details...](#)

| | | | |
|------------------------|-----------------|---------|----------|
| Country of Origin: USA | CHICAGO FAUCETS | | |
| 892-302KJKNF | 1 | \$18.90 | \$207.90 |

Lab Systems: Faucets, Cartridge Replacement, Feb 2013

TheCHICAGO FAUCET SHOPPE
(800) 969-8625 www.chicagofaucetshoppe.com (773) 267-1755
chicagofaucetshoppe.com | restaurantfaucet.com | thefaucetshoppe.com

Date:
02/19/2013

Order#:
104597

Additional Information:

I AGREE TO STORE TERMS AND POLICIES Y

Bill To: (Customer ID#71559)

Robert Morrison
706 Muirkirk Lane
Manchester, MO 63011
United States
314-971-3795
bmorrison@stlcc.edu

Ship To:

Robert Morrison
706 Muirkirk Lane
Manchester, MO 63011
United States
314-971-3795

Payment Method:

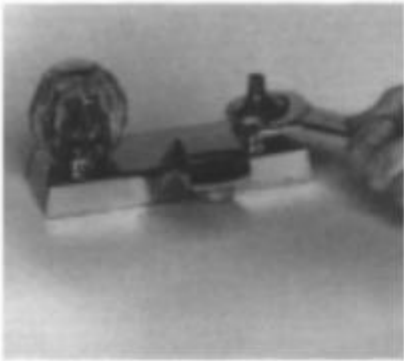
Credit Card: MasterCard
Robt G Morrison Jr.
*****8795

Shipping Method:

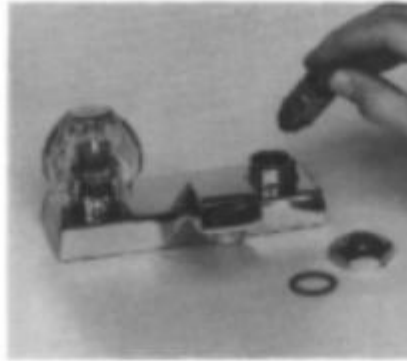
FedEx Home Delivery®

| Code | Description | Qty | Price | Total |
|-------------|--|-----|----------------------|----------------|
| 1-100XTJKNF | Chicago Faucets - 1-100XTJKNF Hot Water Quatum® Cartridge | 1 | \$12.58 | \$12.58 |
| 1-099XTJKNF | Chicago Faucets - 1-099XTJKNF Cold Water Quatum® Cartridge | 1 | \$12.58 | \$12.58 |
| | | | Subtotal: | \$25.16 |
| | | | Tax: | \$0.00 |
| | | | Shipping & Handling: | \$12.75 |
| | | | Grand Total: | \$37.91 |

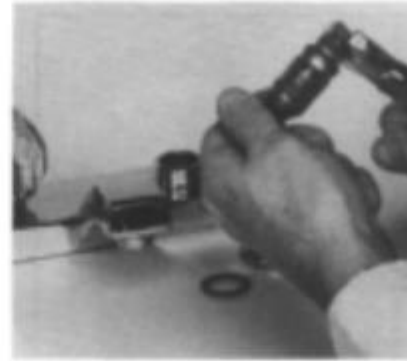
Lab Systems: Faucets, Chicago, Cartridge Repair



Step 1 — Turn off water at stop or main valve. Remove handle assembly and with flat face wrench, remove cap nut (A).



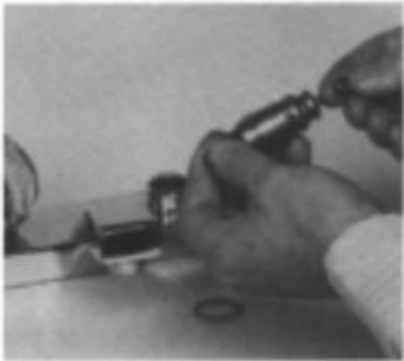
Step 2 — Remove cartridge from faucet. Flush out any rust or chips that may be in body. DO NOT use a file or abrasives to clean out body.



Step 3 — Unscrew stem nut (K) at the bottom of the cartridge with a flat wrench using handle as lever to assist removal.



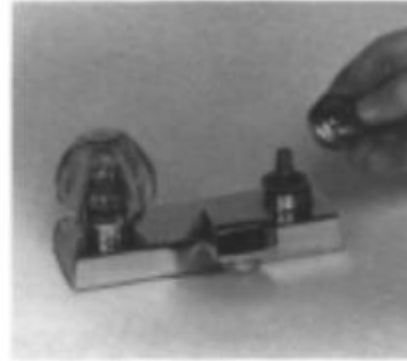
Step 4 — Turn sleeve (D) off stem (C) by holding handle and turning sleeve by hand. As sleeve is removed from stem, seat (F) O-Ring (G) seat washer (H) retainer (I) and washer (J) will be forced off the stem.



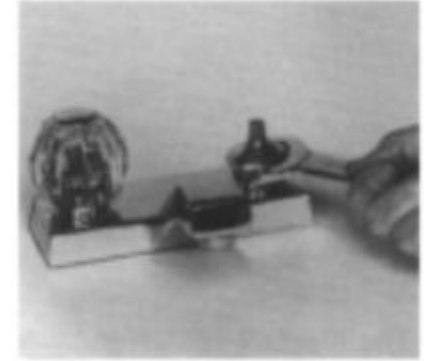
Step 5 — Reassemble sleeve (D) on lightly lubricated stem (C). With new parts add seat (F) O-Ring (G) seat washer (H) retainer (I) and washer (J) on stem (C) and screw nut tightly on stem.



Step 6 — Reposition washer, O-Ring and new packing (B) on stem (D) add sleeve O-Ring (E). Replace cartridge in faucet.



Step 7 — Replace cap nut (A) and partially tighten. Replace handle and rotate cartridge in the direction of closing until the cartridge is in the desired position for convenient operation. Remove handle.

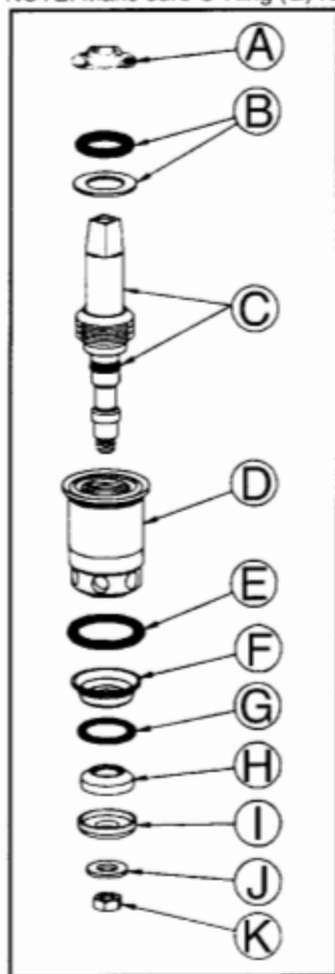


Step 8 — Lock cartridge in place by securely tightening cap nut (A). Turn water on at main valve or stop. Remove aerator. Turn faucet on to full allowing sediment to flush from lines and replace aerator cartridge.

NOTE: Make sure O-Ring (G) remains in place.

Lab Systems: Faucets, Chicago, Cartridge Parts List

NOTE: Make sure O-Ring (G) remains in place.




PARTS LIST

Those parts listed in the "Description" column below that are marked with an asterisk(*) are parts that are recommended for replacement when renewing these operating cartridges. Other parts not so marked may require replacement depending on the amount of wear they have received and their condition when examined.

| Description | Quaturn Operating Cartridges | | | | Slow Compression Operating Cartridges | | | |
|--------------------------|------------------------------|----------------------|---------------|-----------|---------------------------------------|-----------|---------------|-----------|
| | Exposed Cap | | Concealed Cap | | Exposed Cap | | Concealed Cap | |
| | 1-099XT (R. Hand) | 1-100XT (L. Hand) | 377-XT-RH | 377-XT-LH | 217-XT-LH | 217-XT-RH | 274-XT-LH | 274-XT-RH |
| A Cap | 1-214 | 1-214 | 274-004 | 274-004 | 1-214 | 1-214 | 274-004 | 274-004 |
| B Packing Assembly* | 93-131K | 93-131K | 93-131K | 93-131K | 93-131K | 93-131K | 93-131K | 93-131K |
| C Stem Assy. with O-Ring | 1-311K | 1-310K | 274-110K | 274-111K | 1-314K | 1-315K | 274-112K | 274-115K |
| D Sleeve | 2-329 | 2-328 | 2-329 | 2-328 | 317-102 | 317-103 | 317-102 | 317-103 |
| E O-Ring | 2-043 | 2-043 | 2-043 | 2-043 | 2-043 | 2-043 | 2-043 | 2-043 |
| F Seat* | 1-327 | 1-327 | 1-327 | 1-327 | 1-327 | 1-327 | 1-327 | 1-327 |
| G O-Ring | 1-328 | 1-328 | 1-328 | 1-328 | 1-328 | 1-328 | 1-328 | 1-328 |
| H Seat Washer* | 1-021 | 1-021 | 1-021 | 1-021 | 1-021 | 1-021 | 1-021 | 1-021 |
| I Retainer | 1-022 | 1-022 | 1-022 | 1-022 | 1-022 | 1-022 | 1-022 | 1-022 |
| J Washer | 1-031 | 1-031 | 1-031 | 1-031 | 1-031 | 1-031 | 1-031 | 1-031 |
| K Nut | 333-097 | 333-097 | 333-097 | 333-097 | 333-097 | 333-097 | 333-097 | 333-097 |

Hotlink to Chicago Faucet Repair Manual.. pdf

Lab Systems: Faucets, Chicago, Cartridge Repair Kit (if ordered from Grainger our approved supplier)



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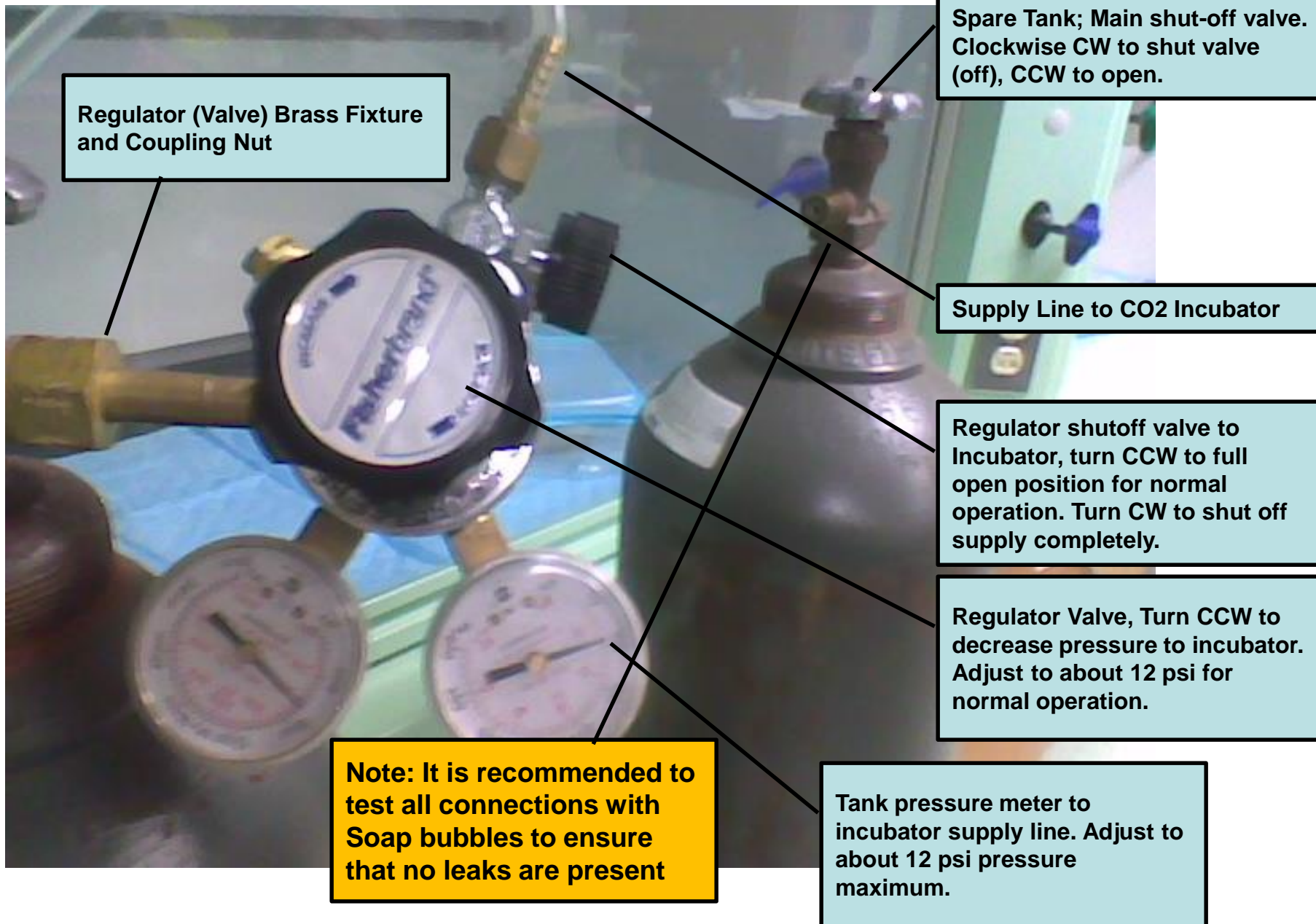
List

Grid

| Select Items to | Grainger Item # and Description | Compliance & Notes | Brand & Model # | Catalog Page # | Availability | Ship Quantity | Price |
|---|--|--------------------|---------------------------------|----------------|--|---------------|----------|
| <input type="checkbox"/> <input type="button" value="Compare"/> | Cartridge Repair Kit, NEW! Item # 26Y254 Cartridge Repair Kit, For Use With Most Faucets | | CHICAGO FAUCETS 1273-ABNF | 4207 | Ready to Ship ? When can I get it? | 1 | \$556.00 |



Lab Systems: Gas Tanks, CO2, other, Regulators



Lab Systems: CO2, Changing Tanks, transfer regulator



Tank Shut off valve

Regulator Shut off valve

Note: It is recommended to test all connections with Soap bubbles to ensure that no leaks are present

Regulator Coupling Nut

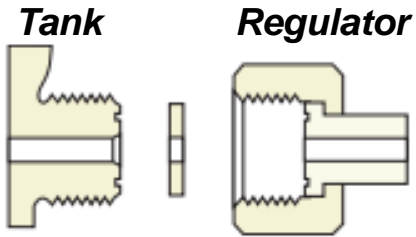
ON ACTIVE TANK

1. Turn Regulator shutoff valve on active tank Clockwise CW to full off position.
2. Turn Tank shutoff valve on the current active tank Clockwise CW to full off position
3. Loosen the Regulator coupling nut with large pliers or wrench (counter clockwise ,CCW to loosen)

ON SPARE or NEW TANK

4. Transfer the Regulator valve assembly to the spare or secondary full tank and tighten the coupling nut by turning it CW until resistance is felt. Be careful not to strip the brass coupling nut or over-tighten.
5. Open the Regular shutoff valve by turning CCW to the full open position
6. Open the Tank shutoff valve by turning CCW slowly until a pressure of <20psi is achieved.
7. Adjust the Regulator main valve to a setting of about 12 psi maximum on the meter.
8. Verify and/or reset CO2 pressure settings on the incubator and wait until desired set level is achieved.

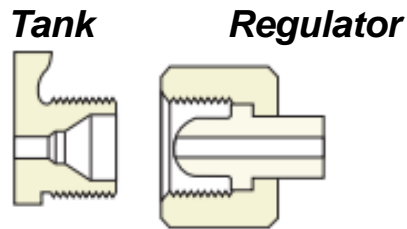
Lab Systems: Gas Supplier Primary, Connection Stds CGA



CO2

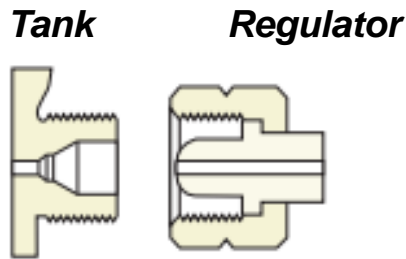
Connection 320 0.825" - 14 RH EXT.,
with Gasket

Name: Airgas Mid America
Phone: (314) 533-3100
Fax: (314) 533-0901 Address: 3500 Bernard Street,
St. Louis, MO 63103
Facility Type(s): Branch
Fill Plant
Specialty Gas Lab - Regional
Equipment Rental
Medical Branch
ISO 9000
Retail Store



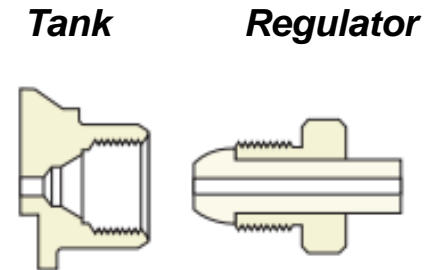
Connection 540 0.903" - 14 RH EXT.

Oxygen



Connection 350 0.825" - 14 LH EXT.

Hydrogen



Connection 580 0.965" - 14 RH INT.

Nitrogen

Hotlink to CGA standards of gases:

http://www.airproducts.com/Products/fastfacts/charts_n_tables/cgaspecs/index.asp

Hotlink to CGA Charts and Tables on Cylinder/Regulator Connections:

Lab Systems: Gas Supplier/Service , Secondary Supplier

[Go](#)**888.243.9353**

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Granite City, IL 62040

Granite City is known to have some of the most giving people in the nation. This combined with its many other treasures makes it a great place for ILMO Products to supply and deliver its **medical**, **industrial**, and **specialty gases**.

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Comments

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Medical, Industrial, and Specialty gases:

- Industrial Application Gases
- Medical Gases
- Specialty Gases
- Gas Equipment
- Specialty Gas Equipment
- Welding Gas Equipment
- Gas Equipment Accessories



Lab Systems: Gas Safety; Safety Brochures

Hotlink to Gas SafetyGrams: Brochures for each gas with safety information

<http://www.airproducts.com/Responsibility/EHS/ProductSafety/ProductSafetyInformation/Safetygrams.htm>

Site home
Air Products Home

Cryogenic Liquids

- > Argon-Liquid – Safetygram 8 (232k)
- > Helium-Liquid – Safetygram 22 (55k)
- > Hydrogen-Liquid – Safetygram 9 (122k)
- > Nitrogen-Liquid – Safetygram 7 (167k)
- > Oxygen-Liquid – Safetygram 6 (150k)
- > Cryogenic Liquids-Safe Handling – Safetygram 16 (63k)
- > Cryogenic Liquid Containers – Safetygram 27 (202k)
- > Safe Operation of Liquid Nitrogen Food Freezers – Safetygram 47 (122k)

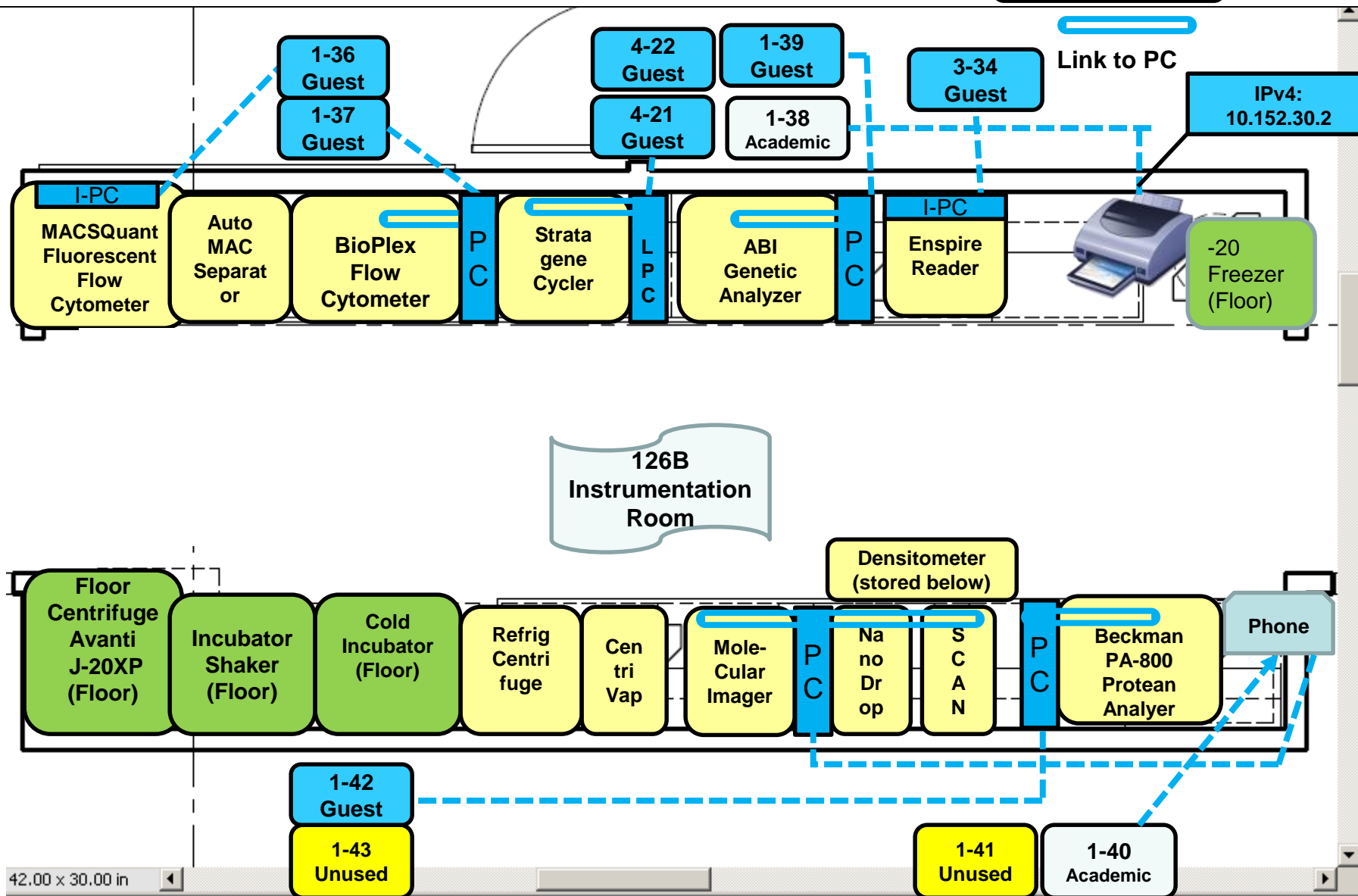
Cylinder and Bulk Compressed Gases

- > Acetylene – Safetygram 13 (348k)
- > Argon-Gas – Safetygram 3 (58k)
- > Carbon Dioxide – Safetygram 18 (139k)
- > Carbon Monoxide – Safetygram 19 (192k)
- > Helium-Gas – Safetygram 5 (69k)
- > Hydrogen-Gas – Safetygram 4 (161k)
- > Nitrogen-Gas – Safetygram 2 (88k)
- > Oxygen-Gas – Safetygram 1 (58k)
- > Oxygen and Oxygen-Enriched Mixture Hazards – Safetygram 33 (407k)
- > Oxygen-Deficient Atmospheres Dangers – Safetygram 17 (39k)

Cylinders and Equipment

- > Compressed Gas Cylinders – Safetygram 10 (158k)
- > Compressed Gas Cylinders-Emergency Action for Handling Leaks – Safetygram 11 (34k)
- > Cylinder Pressure-Relief Devices – Safetygram 15 (42k)
- > Cylinder Valve Outlet Connections – Safetygram 31 (52k)
- > Cylinder Valves – Safetygram 23 (283k)
- > Don't Turn a Cylinder into a Rocket – Safetygram 14 (98k)
- > Liquefied Compressed Gases in Manifolded Systems – Safetygram 38 (72k)
- > Liquefied Compressed Gases-Safe Handling – Safetygram 30 (132k)
- > Medical Oxygen Cylinders – Safetygram 21
- > Oxygen Bars, Policy Not to Supply – Safetygram 35 (95k)
- > Regulator Selection, Installation, and Operation – Safetygram 12 (49k)

Computer Systems: Instrumentation Room Layout and Network Connections



Lab Systems: Gas Cylinder Wall Brackets



Radnor® Model WB100C Steel Single Cylinder Wall Bracket With Chain

Airgas PN: RAD64003560 , Price \$25.96

Radnor® Cylinder Wall Brackets are designed to hold cylinders firmly and safely in place. The rugged steel construction is powder coated and comes ready to install complete with holding chain. Will accomodate 7" - 9-1/2" cylinders and when properly installed will meet insurance requirements by eliminating the hazards of loose cylinder

Bioprocessing: Gases, Flashback Arrestor, Airgas supplier

Recommended with any flammable gas:

From Airgas STL: PN Y33-1FA44

Manf: SuperFlash

Model: DGN, Fuel, 1/4" NPT



Flashback Arrestor for Regulators and Point of Supply. Model DGN flashback arrestors can easily be installed on the outlet fitting of most regulators and gas supply points. They help meet ANSI Z49.1:2005, OSHA, and NFPA safety requirements and help protect against the most common causes of accidents such as reverse gas flow, flashback, and hose burn backs. Each DGN is 100% tested with actual flashbacks and have built in 100 micron inlet filters, reverse flow check valves, flame barriers, and thermal cut-off. Inlet: G-3/8" Female LH x Outlet: G-3/8" Male LH, Fuel Gas Service Model: DGN

Lab Systems : Millipore – Elix 10

Elix 10 UV Water Purification System

Product Water Volume: 100–500 L/Day

Product Use: Produces analytical-grade water quality with bacterial counts reduced to 1 cfu/ mL from tap-feed

Trade Name: Elix

Applications:

100 to 200 L per day

Voltage:

120 V / 60 Hz

Cartridge Used:

- Progard
- RO Membrane Cartridge

Water Quality: Type II

Product Water TOC, ppb: *Less Than 30*

Height, cm (in): 45.7 (18)

Feed Water Nature: Tap water

Microorganisms, cfu/mL: < 1

Operating Weight, kg (lb): 16 (35.3)

Nominal Permeate Flow, L/h: 10

Conductivity, $\mu\text{S}/\text{cm}$: < 0.2

System Recovery, (%): 24

Silica Removal (%): >99.9

Width, cm (in): 25.5 (10)

Product Water Resistivity, $\text{M}\Omega\cdot\text{cm}$ (@ 25 °C):

Pure Water *Greater Than 5*

Validation Support:

Full Support

Depth, cm (in): 31.5 (12.4)

Applications

- Microbiological media preparation
- Buffer preparation
- Hydroponics
- Manufacturing chemical and biochemical reagents
- Purified water for pharmaceutical applications (according to US and European Pharmacopeia)
- Feed for laboratory equipment (washing machines, clinical analyzers, stability chambers, humidifiers, autoclaves, weathering test equipment instruments, hydrogen gas generators)
- Feed to Milli-Q® ultrapure water systems

Features

- A unique and easy-to-install prefiltration pack unit
- Self-maintenance of the reverse osmosis membrane
- Self-regeneration of the ion-exchange resins by an electrical current
- Advanced reverse osmosis technology with high recovery loop reduces water consumption by more than 50%
- Constant product flow rate
- Integrated UV lamp for optimum water quality for applications sensitive to bacteria
- All system functions are accessible from a user-friendly keypad and displayed on backlit screen



Lab Systems: Stool, Counter Height, Black Vinyl,

MIDSCI CAT #: 1219-T2-G6 (comes with standard casters for carpeted floors)

Add – W4 option for hard floor casters (original orders for BRDG)

Pneumatic seat height adjustment (25"-35")
Seat back height adjustment
18" chrome-plated foot ring
Standard hard wheel castors (for carpeted areas)
Black nylon base
Four Arm Styles (arms optional)

Replacement for #1219 above 9/13/11

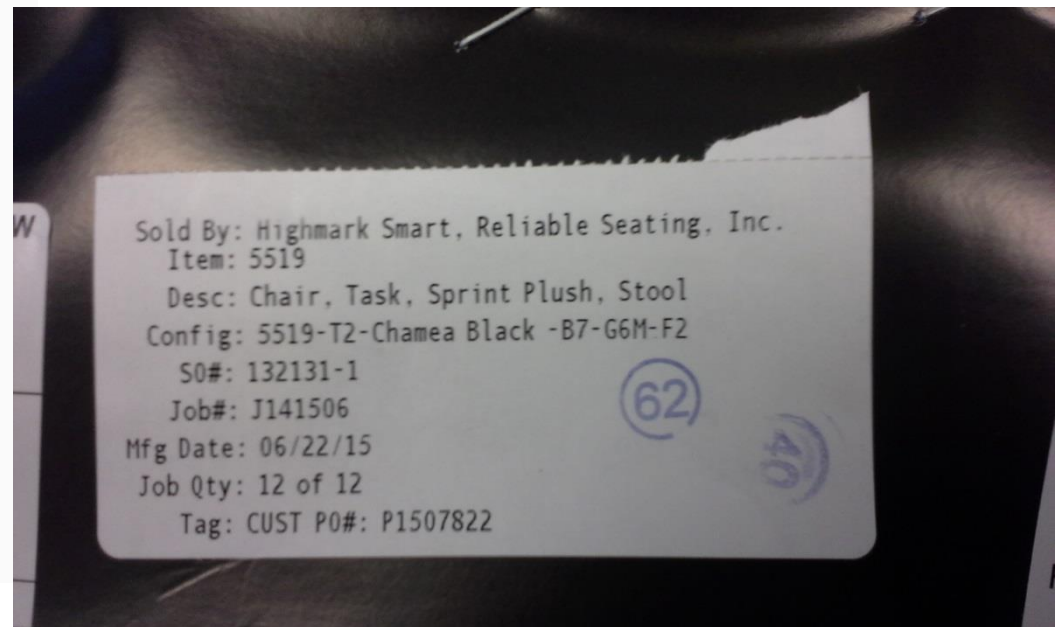
MIDSCI CAT # 5519-T2-G6

Lab Stool, Counter-Height,
Black Vinyl, w/o Arms

Quote: \$315 ea.



Additions Order Chairs: June 2015 ; 12 total



Lab Systems: Security, Door Locks,w Codes w Timer

The Keyless Lock Store™ <http://www.nokey.com/ucaelpulalo.html>

With this new lock you can pre enter or schedule codes that are effective for only specific time periods or dates. This can be done with either PIN numbers (codes) or with optional buttons (Dallas Chips). This is a very handy feature for rentals. The ultimate renters lock and unlike some other locks, there are NO recurring monthly fees!

General Features:

Access Type: iButton or Keycode or Dual Access

Set Up Method: Use Function Code to setup user from Keypad, lighted pad

User Capacity: 299 pin codes

Auto Lock Function: Set the lock to automatically lock at preset time

Storeroom Mode or **Classroom Mode - always locked on the outside and always free to unlock from the inside**

User time lockout: Optional set time restricted user

Choose either model Type: Software version and non software version.

Set time restricted user - you control the time and date any user can unlock with either the software or non software model.

Hardware Features:

Keypad - 12 numeric buttons Power Supply: 4 standard AA batteries

Battery Life Expectancy: 10,000 operations, low battery warning when system drops below 4.8 volts.

Finishes: Stainless Steel, or Brass. Handles: Lever type. Key Bypass: Standard on all units

Door Preparation: Standard and easy 2 1/8 inch diameter ANSI A115 Series Prep, modified by adding additional 5/8" through-bolt holes to add stability to the lock and increase security.

Will work with door thickness of 1 3/8 to 1 3/4 inches. See option below for thicker door.

Strike Plate ANSI Standard 115.3. 1-1/8 x 2-3/4 inch T strike with 1-1/4 lip-to-center dimension.

Comes with 2 latches for 2 3/4 inch and 2 3/8 inch backsets with 1/2 inch throw. A standard one inch diameter bore is required.

Each Lock includes one user ibutton key Each Lock includes 2 keys (Schlage type C 6 pin keyway)

Materials: Tough Zinc Alloy

Working temperature: 0°F-120°F (-18°C-50°C) - Exposure to All weather conditions are OK but inside part of the lock should be exposed to the weather.

Accessibility Standard Meets ADA standards Americans with disabilities act.

Program Features:

Keypad Functions: Temporary codes, Permanent codes

Memory Retention Flash memory never loses memory even without power.

Programming / Communication Method iButton program key, no annoying wires.

iButton Functions Time zones for lock function (automatically unlock or lock), fully programmable exception dates (holidays, etc.), and time zones for iButton key users. iButton User Capacity 500.

Anti-tamper Red-warning light stays on for 60 seconds after 3 invalid entries



Lab Systems: Cart, Small, VWR Stainless



VWR® Stainless Steel Utility Carts
Supplier: VWR International

| Overall Dimensions, W x L x H, cm (in.) | Shelf Clearance,cm (in.) | Capacity,kg (lbs.) | Caster Size,cm (in.) | Shipping Weight,kg (lbs.) | VWR Catalog# | Unit | Price |
|---|--------------------------|--------------------|----------------------|---------------------------|--------------|------|----------|
| 45.7 x 68.6 x 83.8 (18 x 27 x 33) | 31.1 (121/4) | 136.1 (300) | 8.9 (31/2) | 14.5 (32) | 97005-268 | Each | \$277.00 |

Lab Systems: Easel, Presentation, Markup, Pad Holder



Presentation Easel, w/27"x35" Magnetic Board,42" to72"H,Black Sturdy tripod easel features a 27" x 35" magnetic markerboard and flipchart pad retainer that holds any standard-size flipchart pad. Includes full-length accessory tray and nonskid plastic feet that won't mar floors. Legs lock into place and fold for storage and easy transport. Tripod easel adjusts from 42" to 72" high for tabletop or floor use.

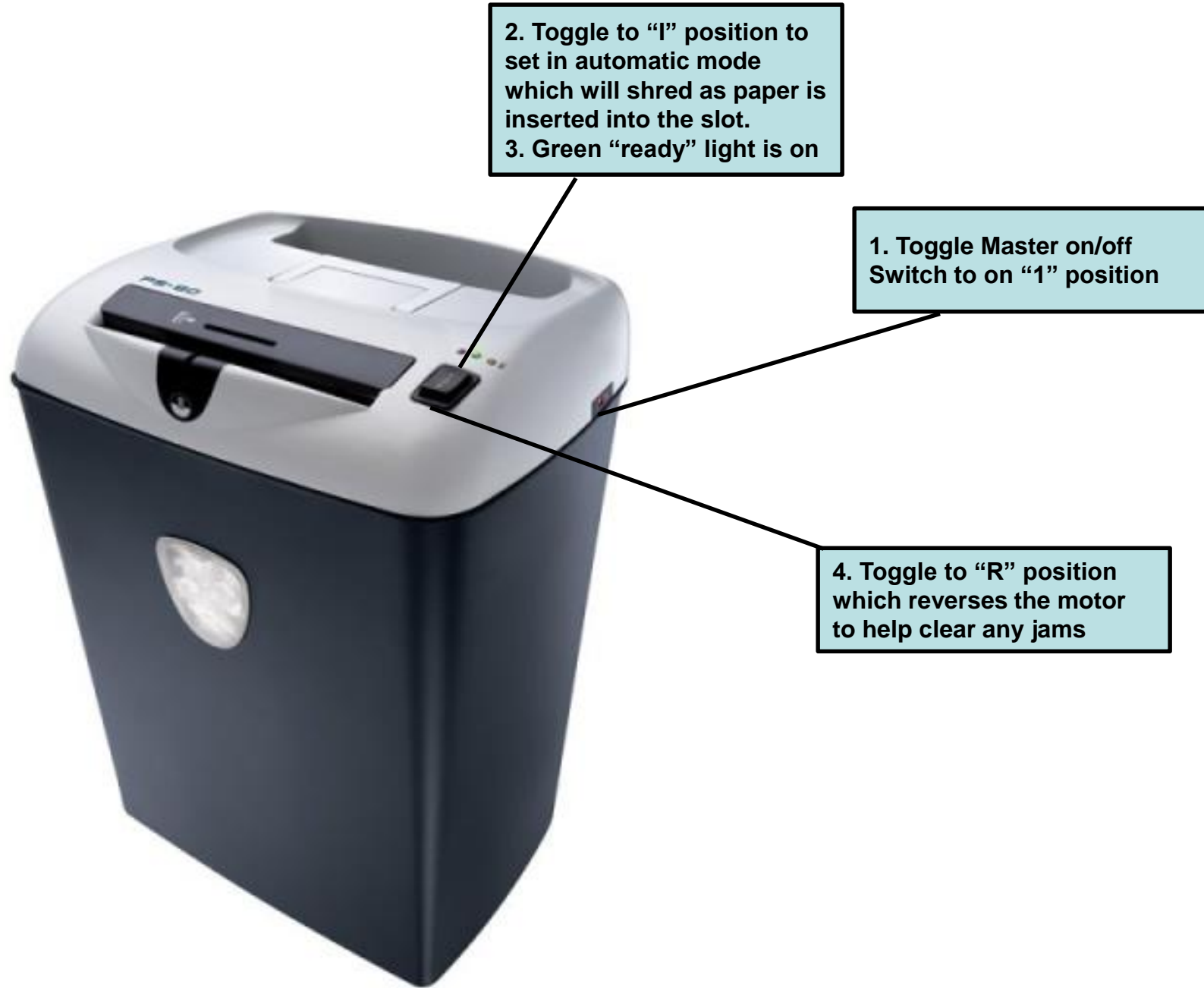
Supply Concepts Item #: QRT-67E \$ 219.70



Easel Pad, Plain, 50 Sheets, 27"x34", 2/CT, White Easel Pad is ideal for larger group presentations. Letr-Trim 16 lb. paper perforated for easy and clean separation. Three-hole punched to fit all standard easel stands.

Supply Concepts: Item #: TOP-7903 \$65.98

Lab Systems: Shredder, Office



Lab systems: BRDG, Dehumidifier, IDYLIS



Idylis 70-pint dehumidifier with pump option (large size area over 3000 sq ft) is ideal for that very damp space that feels and smells wet.

Integrated pump allows for continuous operation that pumps water vertically up to 15-ft into a basin or laundry tub.

Direct drain option for continuous use without having to empty bucket.

Electronic controls with adjustable humidistat and clean filter indicator.

Low temperature feature allows the system to continue to operate until temperature reaches 41°F(5°C)

Auto restart feature; restarts the unit after a power outage.

Auto deicer prevents ice build up on coils

Easy clean removable air filter Quiet operation

[*Link to IDYLIS Product Manual*](#)

Lab Systems: Clamp Light, Horticulture

Wards Scientific; [www. Wardsci.com](http://www.Wardsci.com)

| Item # | Description | Price | Qty |
|-----------|---------------------------------|-------|---------|
| 36 V 4168 | Clamp Lamp with Reflector | | \$16.45 |
| 36 V 4173 | Light Bulb, 150 W, 120 V, Clear | | \$6.50 |



Lab: Typical Student Workbench @ FV Campus

